

PATENT ABSTRACTS OF JAPAN

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(54) RECORDING SHEET

(57)Abstract:

PURPOSE: To provide a recording sheet in which ink absorbency and glossiness are improved in the sheet in which an image can be formed by ink jet recording, etc.

CONSTITUTION: A recording sheet comprises an opaque support and a colorant receiving layer provided on the support, wherein the surface of the support at the side provided with the layer has glossiness of 70% or more and the layer is made of silica particles having mean primary particle size of 10nm or smaller and a water-soluble resin.

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CLAIMS

[Claim(s)]

[Claim 1] The sheet for record with which it is the record sheet which consists of a color-material acceptance layer prepared on an opaque base material and on it, and the near front face in which the color-material acceptance layer of this opaque base material is prepared has 70% or more of glossiness, and this color-material acceptance layer is characterized by being the layer which primary [an average of] particle diameter becomes from a silica particle and water soluble resin 10nm or less.

[Claim 2] The sheet for record according to claim 1 with which this opaque base material has the enveloping layer of polyolefine on the near front face in which a color-material acceptance layer is prepared.

[Claim 3] The sheet for record according to claim 1 which has the enveloping layer of the polyolefine with which this opaque base material contains white pigments on the near front face in which a color-material acceptance layer is prepared.

[Claim 4] The sheet for record according to claim 1 with which this opaque base material consists of an enveloping layer of the polyolefine containing paper and the white pigments formed in the near front face in which the color-material acceptance layer is prepared.

[Claim 5] The sheet for record according to claim 1 with which this opaque base material consists of an enveloping layer of the enveloping layer polyolefine of the polyolefine containing a white plastic film and the white pigments formed in the near front face in which the color-material acceptance layer is prepared.

[Claim 6] The sheet for record according to claim 1 with which this opaque base material contains the metal thin layer prepared in the near front face in which a white plastic film and its color-material acceptance layer are prepared.

[Claim 7] The sheet for record according to claim 1 with which this color-material acceptance layer has 50 - 80% of voidage.

[Claim 8] The sheet for record according to claim 1 with which the weight ratio of a silica particle 10nm or less and water soluble resin has this primary [an average of] particle diameter in the range of 1.5:1-10:1.

[Claim 9] The sheet for record according to claim 1 which is a sheet for ink jet record.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the sheet for record suitable for carrying out image formation using color material. It is related with the sheet for record for forming the image sheet of high gloss by ink jet record especially.

[0002]

[Description of the Prior Art] In recent years, the record approach and equipment which various information processing system was developed and fitted each information system are also developed and adopted with rapid development of an information industry. It miniaturizes, there is also no noise and the equipment used in such a record approach in the thermal-ink-transfer-printing record using the ink record using an ink jet or a plotter and melting mold color material, or sublimation mold color material has become a light weight and the thing excellent also in operability and maintainability. Furthermore, the equipment used by such record approach is widely used from colorization being easy recently. Moreover, colorization progresses also in record of the conventional electrophotography method, and the full color printer and the copying machine have been developed and commercialized with high resolution.

[0003] although the method of various kinds [method / ink jet] is developed — an object — there are three sorts, the approach using the coloring matter solution (water color ink) which roughly divides sexually and contains water-soluble coloring matter, the approach using the coloring matter solution (oily ink) containing oil solubility coloring matter, and the method of carrying out thermofusion of the low melting point solid wax (wax ink) containing coloring matter, and using it. The mainstream is a type which uses water color ink. Anyway, it is the approach of making breathe out a liquefied particle drop and forming an image on the sheet for record.

[0004] In the above-mentioned ink jet record, when obtaining a minute image, liquefied ink is absorbed early, and it is required that there is neither an ink blot nor ink *****. Furthermore, while the hard copy which formed the image in the sheet for ink jet record has the above-mentioned minute image, it is required that glossiness should also be high. That is, when the film photo which is the ideal of hard copy is considered, high glossiness is the important technical problem which should be attained.

[0005] In order to improve the above-mentioned ink absorptivity, various proposals are made from the former. For example, in the case of ink jet record, the activity of an absorptivity polymer is proposed by the color-material absorption layer, and the activity of solubility or the bloating tendency matter is proposed by JP,56-80489,A at JP,55-146786,A, and the activity of many polymer systems (polyvinyl alcohol (PVA), a polyvinyl pyrrolidone (PVP), polyethylene oxide (PEO), carboxymethyl cellulose (CMC)) is proposed. However, the pass-through effect of the water color ink by the hydrophilic radical or dissociative radical of a polymer was used, even if it thickened the film for this reason, sufficient ink rate of absorption was not obtained, and these absorptivity ingredients had inadequate control of a color mixture blot.

[0006] Moreover, the approach of carrying out ink absorption by capillarity is proposed by JP,63-22997,B, JP,63-56876,B, JP,3-21357,B, JP,3-48867,B, JP,57-14091,A, JP,60-61286,A, JP,60-214989,A, JP,61-22983,A, and JP,62-227684,A by using a color-material acceptance layer as

porous membrane. Although the color-material acceptance layer of such porous membrane is comparatively high about ink absorptivity, The method of using a porosity inorganic pigment for the pan with which high gloss is not obtained when light was scattered about (diffraction scattering, Mie scattering), and it considers as a record sheet since optical transparency was low since the aperture of porous membrane is too large according to examination of this invention person at a color-material acceptance layer is proposed by JP,55-144172,A, JP,56-148584,A, JP,56-148585,A, JP,62-273881,A, JP,3-24906,B, JP,60-245588,A, etc. High gloss is not obtained, when light scattering happens and it considers as a record sheet, since the color-material acceptance layer which consists of these porosity inorganic pigments also has a too large particle size of a pigment according to examination of this invention person. Moreover, the approach of using it, making condense the gaseous-phase method silica of 10-30nm of diameters of a primary particle secondarily is proposed by JP,3-56552,B. However, according to examination of this invention person, in the color-material acceptance layer which used the porosity inorganic pigment as which only such a refractive index or particle diameter was specified, since [that a refractive index was large or] particle diameter was large, sufficient transparency was not acquired. Moreover, the record sheet with which the color-material acceptance layer which has a detailed hole using a pseudo-boehmite system particle was formed is indicated by JP,2-276670,A and JP,3-281383,A. According to examination of this invention person, these were good about ink absorptivity, but since a refractive index was as high as about 1.65, sufficient transparency was not acquired. [0007] Therefore, in the sheet for ink jet record, the high (that is, high gloss is obtained) color-material acceptance layer of transparency with good and ink absorptivity is not obtained. Moreover, as a base material of the sheet for ink jet record given in the above-mentioned official report, it is paper of fine quality, a report grade paper, a plastic film, etc. of low glossiness (15% or less), and is opaque, and there is no publication that a glossy base material is used, and these official reports indicate the means for raising ink absorptivity.

[0008] In addition to the paper of fine quality of the above-mentioned low glossiness (15% or less), and a report grade paper, from the former, the art paper of high gloss, coat paper, a cast-coated paper, etc. are used as a base material of the sheet for ink jet record. The record form with which surface glossiness has the coat of the polyvinyl alcohol over which the bridge was constructed on 80% or more of cast-coated paper in JP,6-155892,A as a sheet for ink jet record of high gloss, for example is indicated. However, by the coat of the polyvinyl alcohol with which the bridge was constructed over the color-material acceptance layer, although glossiness with such an expensive record form is obtained, as mentioned above, sufficient ink absorptivity is not acquired. Moreover, the record material which prepared the layer which uses a pseudo-boehmite system particle as a color-material acceptance layer on the resin sheet containing white pigments, and has a detailed hole in JP,6-199035,A is indicated. However, highly [glossiness] enough, as the layer of a pseudo-boehmite system particle was mentioned above, although ink absorptivity is good, since its light transmission nature is not enough, it cannot be said to be the record material of high gloss by the resin sheet of this record material.

[0009]

[Problem(s) to be Solved by the Invention] this invention person came examination in piles variously, in order to obtain the sheet for ink jet record which can form a quality (it has sharpness by high gloss) image especially. Consequently, it became clear that the color-material acceptance layer which consists of the silica particle and water soluble resin of the specification which shows good ink absorptivity and high light transmission nature was solvable by preparing on an opaque base material with surface high glossiness.

[0010] Therefore, this invention is the sheet for record which can form an image sheet image by ink jet record, thermal transfer recording, or electrophotography record, and it aims at offering the sheet for record which can form a sharp image. Especially this invention is the sheet for record whose ink absorptivity and glossiness which can form an image by ink jet record improved, and it aims at offering the sheet for record which can form a sharp image.

[0011]

[Means for Solving the Problem] The above-mentioned object is a record sheet which consists of a color-material acceptance layer prepared an opaque base material and on it, the near front face in

which the color-material acceptance layer of this opaque base material is prepared has 70% or more of glossiness, and this color-material acceptance layer can attain it with the sheet for record characterized by being the layer which primary [an average of] particle diameter becomes from a silica particle and water soluble resin 10nm or less.

[0012] The above-mentioned glossiness is JIS. It is the value calculated by measuring according to the approach of a publication to P-8142 (75-degree specular gloss test method of paper and the paper board).

[0013] The desirable mode of the sheet for record of this invention is as follows.

- 1) An opaque base material has the enveloping layer of polyolefine on the near front face in which a color-material acceptance layer is prepared.
- 2) It has the enveloping layer of the polyolefine with which an opaque base material contains white pigments on the near front face in which a color-material acceptance layer is prepared.
- 3) The above-mentioned opaque base material consists of an enveloping layer of paper and the polyolefine (white pigments are contained preferably) prepared in the near front face in which the color-material acceptance layer is prepared.
- 4) The above-mentioned opaque base material consists of an enveloping layer (white pigments are contained preferably) of a white plastic film and the polyolefine prepared in the near front face in which the color-material acceptance layer is prepared.
- 5) The above-mentioned opaque base material contains the metal thin layer prepared in the near front face in which a white plastic film and its color-material acceptance layer are prepared (base material which the white-with metal thin layer plastic film used the metal thin layer as the front face, and was preferably pasted up on one [at least] front face of double-sided polyethylene paper).
- 6) The above-mentioned opaque base material is a base material used for a film photo.
- 7) The above-mentioned color-material acceptance layer has 50 - 80% of voidage.
- 8) The weight ratio of a silica particle 10nm or less and water soluble resin has the above-mentioned primary [an average of] particle diameter in the range of 1.5:1-10:1.
- 9) The above-mentioned primary [an average of] particle diameter is less than (preferably 3-9nm) 10nm.
- 10) The above-mentioned color-material acceptance layer has the pore which has the average diameter of 5-30nm.
- 11) The above-mentioned silica particle is 2 1nm to a front face. It is the silicic anhydride which has the silanol group of 2-3 hits.
- 12) The above-mentioned sheet for record is an object for ink jets.

[0014] The sheet for record of this invention has the basic configuration which consists of a color-material acceptance layer prepared in one front face of an opaque base material and a base material. A color-material acceptance layer may be prepared in both sides of a base material.

[0015] The sheet for record of this invention can be manufactured as follows, for example. As an opaque base material, it is opaque, and if the glossiness of the near front face in which a color-material acceptance layer is prepared at least is the sheet which it has 70% or more, the sheet of arbitration can be used. Paper of high gloss, such as a baryta paper used for art paper, coat paper, a cast-coated paper, the base material for film photos, etc.; Polyester, such as polyethylene terephthalate (PET) Cellulose ester, such as a nitrocellulose, cellulose acetate, and cellulose acetate butylate With furthermore, plastic films, such as polysulfone, polyphenylene oxide, polyimide, a polycarbonate, and a polyamide The film of the high gloss which this film was made to contain white pigments etc. and carried out opacity to it (performing surface calender processing etc.), or white pigments are contained on the front face of content plastics, such as the above-mentioned paper, the above-mentioned transparence plastic film, or white pigments, — it is — it is — the base material with which the enveloping layer of the polyolefine which is not contained was prepared can be mentioned.

[0016] The special kind paper in which the above-mentioned baryta paper, polyolefine coat paper (a kind of the base material with which the enveloping layer of polyolefine was prepared), or a metal vacuum evaporatio layer currently used as a base material for film photos was prepared can be suitably used by this invention. The enveloping layer of the polyolefine containing polyolefine or

white pigments is formed in the near front face in which the color-material acceptance layer of paper and an opaque plastic sheet is prepared, and the opaque base material of this invention has a desirable base material. Even if it uses a transparency plastic sheet, an opaque base material is obtained, in the case of the enveloping layer of the polyolefine with which the enveloping layer of polyolefine contains white pigments, it is **, and it can also use this by this invention. As white pigments, a titanium dioxide, a calcium carbonate, and a zinc oxide can be mentioned. It is a titanium dioxide preferably. Furthermore, a color pigment, a fluorescent brightener, an antioxidant, etc. may be added.

[0017] The paper containing the enveloping layer which consists of a metal thin layer prepared in a polyolefine coat paper, b polyolefine coat plastic film and c white plastic film, and its front face as a desirable example of the opaque base material of this invention can be mentioned.

a) The base material for film photos which consists of an enveloping layer which consists of paper and polyolefine prepared in the front face as polyolefine coat paper, and consists of a polyethylene layer containing the titanium oxide which carried out size press processing of the stencil given in JP,4-149432,A, for example, was prepared in the front face can be mentioned. Especially definition does not have the paper used for polyolefine coat paper, and anythings can be used for it. For example, it can obtain by adding and carrying out paper making of a loading material, a sizing compound, the paper reinforcing agent, etc. by using natural pulp as the main raw material. In this way, polyolefine coat paper can be manufactured by extruding polyolefine on the front face of the obtained stencil, and covering with coating (the extruder and laminator for polyolefines being used). As polyolefin resin, polymers and such mixture, such as high density polyethylene, low density polyethylene, and polypropylene, can be mentioned. High density polyethylene, low density polyethylene, and such mixture are desirable. As for the molecular weight of such polyolefines, 20000-200000 are desirable. The thickness of a polyolefin resin layer has desirable 15-50 micrometers. In polyolefin resin, white pigments, a color pigment, a fluorescent brightener, an antioxidant, etc. may be added.

b) It consists of an enveloping layer which consists of a white plastic film and polyolefine prepared in the front face as a polyolefine coat plastic film, and the base material for film photos which prepared the low-density-polyethylene layer which contains a high-density-polyethylene layer in one side, and contains titanium oxide in another side on the front face of calcium-carbonate content polyester film given in JP,3-214343,A can be mentioned. It is a white plastic film, the plastic film of the above-mentioned polyolefine coat plastic film has polyester resin, such as polyethylene terephthalate, polystyrene, and a desirable polyvinyl chloride as the polymer ingredient, and especially its polyester is desirable. A white plastic film makes for example, the above-mentioned polymer contain an inorganic pigment, and can be created by making a void (detailed air bubbles) form by drawing by mixing other polymers, such as polystyrene, and making a void (detailed air bubbles) form into (JP,3-76727,A) or polyester resin (JP,54-29550,B). And a polyolefine coat can be formed like Above a.

c) The base material for film photos which the white-with metal thin layer plastic film used the metal thin layer as the front face, and was pasted up, for example on the front face of double-sided polyethylene paper given in JP,6-10242,A as a white plastic film and paper containing the metal thin layer prepared in the front face can be mentioned. Generally metal thin layers are metal vacuum evaporatio no film, such as aluminum, and the layer of the copolymer containing a vinyl chloride and/or a vinylidene chloride is further formed on it.

[0018] a and b are desirable in these and especially a is desirable. Although the opaque transparency base material of this invention has 70% or more of glossiness, it is desirable. [80% or more of] Its thickness of an opaque transparency base material is easy to deal with a 50-200-micrometer thing and is desirable although there is especially no limit.

[0019] The color-material acceptance layer of this invention can be formed as follows. A color-material acceptance layer can be formed by applying to the front face of a transparency base material, or the front face of the resin film of acid resistibility the coating liquid which distributed non-subtlety particles, such as a silica particle, to the binder, and drying. As a binder of a color-material acceptance layer, it is desirable to use water soluble resin. As an example of water soluble resin, as resin which has hydroxyl as a hydrophilic structural unit polyvinyl alcohol (PVA) and

cellulose type resin (methyl cellulose (MC) — Ethyl cellulose (EC), hydroxyethyl cellulose (HEC), A carboxymethyl cellulose (CMC) etc. chitins and starch as resin which has; ether linkage Polyethylene oxide (PEO), Polyacrylamide (PAAM) and a polyvinyl pyrrolidone (PVP) can be mentioned as resin which has; an amide group, and amide association for polypropylene oxide (PPO), a polyethylene glycol (PEG), and polyvinyl ether (PVE). Moreover, the poly allylamine (PAA) which has the polystyrene sulfonate salt which has; sulfone radical for the polyacrylate which has a carboxyl group as a dissociative radical, maleic resin, alginate, and gelatin, the amino group, an imino group, the 3rd amine, and the 4th ammonium salt, polyethyleneimine (PEI), an epoxidation polyamide (EPAm), polyvinyl pyridine, and gelatin can be mentioned.

[0020] In this invention, 10nm or less (preferably 3–9nm) silica particle is used for the first [an average of] particle diameter as a non-subtlety particle. The refractive index of the silica particle of about 1.45 is still more desirable.

[0021] the hydrogen bond according [a silica particle] to a surface silanol group — particles — adhesion — being easy — a sake — above — an average of 1 — since the structure where voidage is large can be formed when order particle diameter is 10nm or less, it is desirable to use the silica which has such a particle size, and thereby, ink receptiveness and transparency are markedly alike, and improve. A silica particle is divided roughly into a wet method and dry process according to a manufacturing method. The method of a wet method of the acidolysis of a silicate generating active silica, carrying out the polymerization of this moderately, carrying out flocking settling, and obtaining a water silica is in use. One dry-process silica has a method in use of obtaining an anhydrous silica by the approach (arc process) of carrying out heating hydride generation of the approach (flame hydrolysis), silica sand, and corks by elevated-temperature gaseous-phase hydrolysis of silicon halide with an arc in an electric furnace, and oxidizing this with air. In the case of a silicic anhydride (anhydrous silica), especially voidage is easy to form the high three-dimensional structure and is desirable [a silica] although these water silicas and an anhydrous silica show the property from which there was the difference of the consistency of a surface silanol group, the existence of a hole, etc., and it differed. This reason is 2 5–8 pieces/nm, when the consistency of a surface silanol group is a water silica, although it is not clear. Mostly, when it is easy to condense a particle densely (aggregate) and it is one anhydrous silica, it is 2 2–3 pieces/nm. Since it is few, it is presumed that it becomes **** flocculation (FUKOKYU rate) and voidage becomes high structure.

[0022] As a non-subtlety particle, colloidal silica, a calcium silicate, a zeolite, a kaolinite, halloysite, a muscovite, talc, a calcium carbonate, a calcium sulfate, boehmite, etc. may be used together in addition to the above-mentioned silica particle.

[0023] A single raw material is sufficient as the silica particle and water soluble resin which mainly constitute this color-material acceptance layer, respectively, and the mixed stock of two or more raw materials is sufficient as them. moreover, the color-material acceptance layer may contain acid alkali as various kinds of mineral and a PH regulator, in order are alike other than this and to raise the dispersibility of a particle, although it mainly consists of the above-mentioned silica particle and water soluble resin. Moreover, various kinds of surfactants for the object which raises spreading fitness and surface quality may be used. In order to control surface frictional electrification and exfoliation electrification, or in order to adjust surface electric resistance in a xerography, the metallic-oxide particle with a surfactant with ion conductivity or electronic conductivity may be included. Moreover, a mordant may be used in order to fix coloring matter in ink jet record and to raise a water resisting property. Moreover, various kinds of mat agents for the object which reduces a surface friction property may be included. Moreover, various kinds of antioxidants for the object which controls degradation of color material, and an ultraviolet ray absorbent may be included.

[0024] Formation of the above-mentioned color-material acceptance layer can carry out the water solution or water dispersion (coating liquid) containing for example, the above-mentioned resin, a non-subtlety particle, etc. spreading and by carrying out stoving on a transparence base material (film). Spreading can be performed by the well-known methods of application, such as for example, the Ayr doctor coating machine, a bread coating machine, a rod coating machine, a knife coating machine, a squeeze coating machine, a reverse roll coater, and a bar coating machine. Generally

desiccation is performed for 0.5 – 30 minutes at 50–180 degrees C. hot air drying equipment — comparatively — low temperature — (— preferably, after drying for 0.5 – 3 minutes by 50 – 90 degree-C(3–8m [/second] wind speed)), it is desirable from the point of the crack prevention at the time of desiccation of the color-material acceptance layer before spreading when especially thickness is thick to dry further comparatively at an elevated temperature (preferably 120–180 degrees C for 5 – 20 minutes). Moreover, it is possible by letting between roll nips pass under heating and application of pressure after spreading and desiccation (for example, a supercalender) and with gloss calender etc. to raise surface smooth nature, transparency, and paint film reinforcement. However, decline in voidage needs to perform such processing by setting up few conditions in order to reduce voidage (namely, in order for ink absorptivity to fall).

[0025] In order [of a color-material acceptance layer] to raise especially transparency (a refractive index is lowered), especially when it is an anhydrous silica, PVA is [whenever / low saponification / (70 – 90% whenever / saponification / it is desirable)] suitable [it is required to form many detailed openings, and / the class of resin combined with a silica particle for that purpose is important, and] in respect of light transmission nature. Although PVA has a hydroxyl group in a repeating unit, this hydroxyl group and the silanol group of a silica particle front face form hydrogen bond, and it is considered with making easy to form the three-dimensional network which makes the aggregated particle of a silica particle a chain unit. It is thought that the color-material acceptance layer of the structure where voidage is high is obtained by this. Thereby, a color-material acceptance layer with high transparency is obtained.

[0026] The above-mentioned color-material acceptance layer (transparent membrane which has many openings) has effect also to membrane structure with the big ratio (PB ratio: weight of the non-subtlety particle to the weight 1 of water soluble resin) of a silica particle and water soluble resin. If PB ratio becomes large, voidage, pore volume, and surface area (per unit weight) will become large. When 10 is exceeded, there are not film reinforcement and effectiveness over the crack at the time of desiccation, less than by 1.5, an opening is closed by resin, voidage decreases and a refractive index becomes high. For this reason, the range of 1.5–10 is suitable for PB ratio. In order to acquire high-speed ink absorptivity with an ink jet printer, as for especially PB ratio, two or more are desirable [to touch directly by hand like especially an OHP film, it is necessary to obtain sufficient film reinforcement, as for especially PB ratio, five or less are desirable, and], therefore the range of 2–5 is still more suitable for PB ratio. For example, the three-dimensional network which makes the aggregated particle of a silica particle a chain unit when the first [an average of] above particle diameter distributes thoroughly [PB ratio / 2–5] in a water solution an anhydrous silica and water soluble resin 10nm or less and carries out spreading desiccation is formed, average pore is 30nm or less, and voidage is 50% or more and pore specific volume 0.5 ml/g. Specific surface area can form easily the porous membrane of the translucency more than 100m²/g above.

[0027] the transparent membrane (color-material acceptance layer) which has the opening of above-mentioned a large number — for example, it can prepare on a base material as follows. The above-mentioned coating liquid for color-material acceptance stratification the silica particle of 10nm or less of diameters of an average primary particle underwater — adding (an example, 10 – 15 % of the weight) — a high-speed revolution wet colloid mill (an example —) After carrying out distribution for 20 minutes (usually for 10 – 30 minutes) on condition that the high-speed revolution of 10000rpm (usually 5000 – 20000rpm), using a KUREA mix (M Technique Co., Ltd. make), It can obtain by adding a polyvinyl alcohol water solution (it being set to PVA of about 1/3 weight of an example and a silica like), and distributing on the still more nearly same conditions as the above. Thus, the obtained coating liquid is a homogeneity sol and can obtain the color-material acceptance layer which has a three-dimensional network by forming a spreading layer on a base material by the following method of application using this. In addition, the water which is a solvent is evaporated by drying on the occasion of formation of a color-material acceptance layer, after applying the coating liquid of the above-mentioned homogeneity sol on a base material. When the spreading film reaches gelation concentration by this evaporation, wet gel is formed, further, when desiccation advances, porosity xerogel is formed, and the transparent membrane which has the opening of above-mentioned a large number can be obtained.

[0028] Especially the color-material acceptance layer that is the transparent membrane which has the opening of above-mentioned a large number is excellent in ink receptiveness and transparency. The minute record which absorbs ink quickly by capillarity and has neither ink NIJIMI nor ink ***** is not only possible, but in ink jet record, it can paste up firmly the color material in thermal recording, and the toner in electrophotography record. This reason is because color material etc. is firmly fixed according to the geometrical anchor effect to which color material and a toner go underwater in the pore of a porous layer, and originate in a three-dimensional network as that result. In ink jet record, the thickness of a color-material acceptance layer needs to have the absorption capacity which absorbs all drops, and it is necessary to determine this in connection with the voidage of a paint film. For example, the amount of ink 8nl/mm² By the case, if voidage is 60%, film about 15 micrometers or more is needed. In in ink jet record, the range of 10-50 micrometers is desirable. Thus, although the glossiness on the color-material acceptance layer of the sheet for record obtained is also high, as for the glossiness (prescribed by said base material), it is desirable that it is 50% or more, and it is desirable that it is especially 60% or more.

[0029]

[Example]

[0030] [Example 1]

(1) Carry out paper making and dry, after carrying out beating of the mixed pulp of the production LBPK70 weight section of an opaque base material, and the NBSP30 weight section to Canadian freeness 300ml by the double disc refiner and adding the following ingredient to this pulp slurry, and it is the basis weight of 180g/m². The stencil was obtained.

[0031]

Pulp 100 Weight Section Epoxidation Behenic Acid Amide The 0.3 weight section Alkyl ketene dimer The 0.4 weight section Cation starch The 1.0 weight section Polyamide polyamine epichlorohydrin The 0.2 weight sections Cationic polyacrylamide The 0.5 weight sections [0032] It is the sizing compound (water solution) of the following presentation in the obtained stencil by sizing press processing 30 g/m² Impregnation adhesion was carried out.

Polyvinyl alcohol 4 Weight section gamma-aminopropyl triethoxysilane The 0.05 weight sections Fluorescent brightener 0.6 Weight section Defoaming agent The 0.005 weight sections [0033] Subsequently, calender processing of the obtained sizing compound adhesion paper was carried out so that it might become 200 micrometers in thickness with a software calender, subsequently calender processing was carried out with the machine calender, and thickness was adjusted to 175 micrometers. Corona discharge treatment is carried out to the rear face (wire side) of a stencil after that, and it is 3 the consistency of 0.98g/cm. Consistency 0.94 g/cm³ which contains 10% of the weight of titanium oxide after coating the thickness of 25 micrometers with polyethylene and carrying out corona discharge treatment to a right face (felt side) The thickness of 30 micrometers was coated with polyethylene and the opaque base material was obtained.

[0034]

(2) Presentation of the coating liquid for color-material acceptance stratification Dry type silica particle (7nm; 10 weight section refractive index: primary [an average of] particle diameter : 1.45; Aerosil A300 (product made from Japanese Aerosil))

Polyvinyl alcohol (it is the 78%; polymerization-degree 4500; 3.3 weight section whenever [saponification] PVA440 (Kuraray Co., Ltd. make))

Ion exchange water A 136 weight sections dry type silica particle is added to ion exchange water (73.3 weight sections), the polyvinyl alcohol water solution (what was dissolved in the remainder 62.7 weight section of ion exchange water) after making it distribute for 20 minutes on condition that 10000rpm using a high-speed revolution wet colloid mill (KUREA mix (M Technique Co., Ltd. make)) — in addition, it distributed on the still more nearly same conditions as the above, aqueous ammonia adjusted pH to 9.2, and the coating liquid for color-material acceptance stratification was obtained.

[0035] The above-mentioned coating liquid was dried for 10 minutes at 100 more degrees C, after using and applying the air knife coater to the right face (on a titanium oxide content polyethylene layer) of said opaque base material and drying for 1 minute at 70 degrees C (5m [/second] wind speed) with hot air drying equipment. Thereby, desiccation thickness formed the color-material

acceptance layer which is 30 micrometers.

[0036] The sheet for record with which the color-material acceptance layer was prepared in the opaque base material as mentioned above was obtained.

[0037] In the [example 2] example 1, the sheet for record was produced like the example 1 except having used the following base material as said opaque base material.

[0038] (1) Biaxial stretching of the polyester resin (PET) which contained the calcium carbonate with a production mean particle diameter [of an opaque base material] of 0.9 micrometers 15% of the weight was carried out, and it obtained to white polyester film of 3 and SRa0.17micrometer the consistency of 0.9g/cm. It is the solvent solution of the polyester resin which kneaded tin oxide 50% of the weight to both sides of this white polyester film at solid content 0.3g/m² It is the surface electric resistance after applying and drying 5x10⁸ to 5x10⁹ The antistatic layer of omega was formed.

[0039] After carrying out corona discharge treatment to both sides of this film, melting extrusion of the high density polyethylene (consistency 0.960g/cm³, 10 MI=13g /, minutes) was carried out with the resin thickness of 30 micrometers using the melting extruder, and one antistatic layer top was covered with the resin layer of polyethylene (this field is called a rear face). Next, melting extrusion of the low density polyethylene (consistency 0.923 g/cm³, 10 MI=7g /, minutes) which used the melting extruder and contained the ultramarine blue of 15 % of the weight of anatase mold titanium dioxides and a minute amount on another [which did not prepare a resin layer] antistatic layer was carried out with the resin thickness of 32 micrometers, and it covered with the resin layer which has a glossy surface (this field is called a right face).

[0040] After carrying out corona discharge treatment of the high-density-polyethylene resin stratification plane on the back, an aluminum oxide (alumina ZORU -100, Nissan Chemical Industries, Ltd. make) and a silicon dioxide (the Snow tex -0, Nissan Chemical Industries, Ltd. make) are distributed in water by the weight ratio as an antistatic agent one half (alumina ZORU-100 / Snow tex -0), and it is 0.2g/m² at the weight after desiccation. It applied so that it might become.

[0041] The opaque base material was obtained as mentioned above.

[0042] In the [example 3] example 1, the sheet for record was produced like the example 1 except having used the following base material as said opaque base material.

[0043] (1) The polyethylene terephthalate film with a thickness of 25 micrometers filled up with the silica of 3 micrometers of production mean diameters of an opaque base material 2% of the weight has been arranged in vacuum deposition, vacuum deposition was performed on conditions with a degree of vacuum of 10 to 4 torrs, and the vacuum-plating-of-aluminium film whose thickness is 600A on the surface of a film was formed. The adhesives of the following presentation are diluted with ethyl acetate on the front face of this vacuum evaporatio film, and the coverage after desiccation is 5 g/m². It applied so that it might become, and it dried in oven for 2 minutes at 100 degrees C.

(Adhesives presentation)

Vinyl chloride / vinylidene-chloride / vinyl acetate/ 56 Weight section Maleic-anhydride copolymer Tolyene diisocyanate 37 Weight section Trimethylol propane adduct Epoxidation aliphatic alkylester (molecular weight 350 [about]) 7 Weight ***** was carried out and the film with a vacuum evaporatio layer was obtained.

[0044] After carrying out beating of the mixed pulp of the LBPK80 weight section and the NBSP20 weight section to Canadian freeness 300ml by the double disc refiner and adding the following ingredient to this pulp slurry, paper making is carried out and it dries, and it is basis weight 160 g/m². The stencil was obtained. Consistencies are 1.0 g/cm³ by the ASHIN calender. It adjusted.

[0045]

Pulp 100 Weight Section Sodium Stearate The 1.0 weight section Anion polyacrylamide The 0.5 weight section Aluminum sulfate The 1.5 weight section Polyamide polyamine epichlorohydrin The 0.5 weight sections Alkyl ketene dimer The 0.5 weight sections [0046] After carrying out corona discharge treatment of one side of the obtained stencil, melting extrusion of the low density polyethylene (consistency 0.923g/cm³, 10 MI=7g /, minutes) was carried out with the resin thickness of 30 micrometers using the melting extruder, and one field (right face) of paper was

covered with the resin layer of polyethylene. Next, after carrying out corona discharge treatment of another [which did not prepare a resin layer] field, melting extrusion of the high density polyethylene (consistency 0.950 g/cm³, 10 MI=8g /, minutes) was carried out with the resin thickness of 30 micrometers using the melting extruder, and it covered with the resin layer (this field is called a rear face). In this way, both sides produced the paper laminated with polyethylene. [0047] Next, the coverage after drying the polyurethane system 2 liquid type adhesives of the following presentation on the front face of the side which did not prepare the vacuum evaporatio layer of the film with a vacuum evaporatio layer produced previously is 3g/m². It applied so that it might become, and it dried in oven for 2 minutes at 100 degrees C.

(Adhesives presentation)

Pori Bond AY-651A 100 Weight section (Sanyo Chemical Industries, Ltd. make)

Pori Bond AY-651C 15 Weight section (Sanyo Chemical Industries, Ltd. make)

This spreading side and the low-density-polyethylene side of the paper which both sides laminated with polyethylene were doubled, and heating sticking by pressure was carried out by pressure 20 kg/cm. It produced.

[0048] The opaque base material was obtained as mentioned above. The field which has a vacuum evaporatio layer is a right face.

[0049] In the [example 1 of comparison] example 1, the sheet for record was produced like the example 1 except having used the PPC form (regular paper for electrophotography) as an opaque base material.

[0050] A commercial cast-coated paper (trade name: MARIESUTO; by Hokuetsu Paper Mills, Ltd. 80 - 88% of glossiness, the U.S. tsubo 210 - 250 g/m²) is used as a [example 2 of comparison] opaque base material, and the coverage after drying the coating liquid of the following presentation on this is 5 g/m². It applied and dried so that it might become.

(2) Presentation of the coating liquid for color-material acceptance stratification Polyvinyl alcohol (it is the 78 - 81% 7 weight section whenever [saponification] PVA420 (Kuraray Co., Ltd. make))

Water 30 Weight section [0051] The sheet for record with which the color-material acceptance layer was prepared in the opaque base material as mentioned above was obtained.

[0052] About the sheet for record obtained above, the ink jet fitness was evaluated by the following measuring methods.

(1) With the ink rate-of-absorption ink jet printer (PIXEL JET; product made from Canon), the contact press of the paper was carried out immediately after solid printing of the black to the sheet for record (after about 10 seconds), and it judged as follows by the existence of the imprint to the paper of ink.

AA: Ink was not imprinted by paper.

CC: Ink was imprinted by paper.

(2) viewing estimated the sharpness (an image — Sharp) of an image for the image printed by the sheet for record using the same printer as the sharpness above of an image.

AA: Sharpness good BB:sharpness good CC: Poor sharpness [0053] The glossiness of the opaque base material of an example and the example of a comparison and the sheet for record was measured for the following business.

(3) About the opaque base material and the sheet for record which were obtained in the glossiness above-mentioned example and the example of a comparison, it is JIS. According to the approach of a publication, glossiness was measured to P-8142 (75-degree specular gloss test method of paper and the paper board). That is, six test pieces were created, respectively and it measured using the glossmeter (a digital deflection glossmeter, Suga Test Instruments Co., Ltd. make). The average of the obtained measured value was made into glossiness.

[0054]

[A table 1]

Table 1----- . the **** ** _***** ** ***** method

***** ** ** - ** ** machine O ***** **** people *****; -----***** .

**** . **** . **** . ***** . ***** . Pit machine . ***** . **** . **** . **** .

****:-----" ***** . **** . **** . ** . ***** . **** . **** . **** .

****:----- [0055]

[Effect of the Invention] The color-material acceptance layer which consists of a specific silica particle and a water-soluble specific binder is prepared on the opaque base material which has glossiness with the expensive sheet for record of this invention. Since surface glossiness is also high while this secures the outstanding ink receptiveness, the image formed on a color-material acceptance layer of ink jet record etc. is sharp. The polyolefine coat especially used for the base material for the photographic printing papers etc. can be used for a base material, and a sharp image with a very high feeling of gloss can be formed by preparing the above-mentioned color-material acceptance layer.

[Translation done.]

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TECHNICAL FIELD

[Industrial Application] This invention relates to the sheet for record suitable for carrying out image formation using color material. It is related with the sheet for record for forming the image sheet of high gloss by ink jet record especially.

[Translation done.]

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PRIOR ART

[Description of the Prior Art] In recent years, the record approach and equipment which various information processing system was developed and fitted each information system are also developed and adopted with rapid development of an information industry. It miniaturizes, there is also no noise and the equipment used in such a record approach in the thermal-ink-transfer-printing record using the ink record using an ink jet or a plotter and melting mold color material, or sublimation mold color material has become a light weight and the thing excellent also in operability and maintainability. Furthermore, the equipment used by such record approach is widely used from colorization being easy recently. Moreover, colorization progresses also in record of the conventional electrophotography method, and the full color printer and the copying machine have been developed and commercialized with high resolution.

[0003] although the method of various kinds [method / ink jet] is developed — an object — there are three sorts, the approach using the coloring matter solution (water color ink) which roughly divides sexually and contains water-soluble coloring matter, the approach using the coloring matter solution (oily ink) containing oil solubility coloring matter, and the method of carrying out thermofusion of the low melting point solid wax (wax ink) containing coloring matter, and using it. The mainstream is a type which uses water color ink. Anyway, it is the approach of making breathe out a liquefied particle drop and forming an image on the sheet for record.

[0004] In the above-mentioned ink jet record, when obtaining a minute image, liquefied ink is absorbed early, and it is required that there is neither an ink blot nor ink *****. Furthermore, while the hard copy which formed the image in the sheet for ink jet record has the above-mentioned minute image, it is required that glossiness should also be high. That is, when the film photo which is the ideal of hard copy is considered, high glossiness is the important technical problem which should be attained.

[0005] In order to improve the above-mentioned ink absorptivity, various proposals are made from the former. For example, in the case of ink jet record, the activity of an absorptivity polymer is proposed by the color-material absorption layer, and the activity of solubility or the bloating tendency matter is proposed by JP,56-80489,A at JP,55-146786,A, and the activity of many polymer systems (polyvinyl alcohol (PVA), a polyvinyl pyrrolidone (PVP), polyethylene oxide (PEO), carboxymethyl cellulose (CMC)) is proposed. However, the pass-through effect of the water color ink by the hydrophilic radical or dissociative radical of a polymer was used, even if it thickened the film for this reason, sufficient ink rate of absorption was not obtained, and these absorptivity ingredients had inadequate control of a color mixture blot.

[0006] Moreover, the approach of carrying out ink absorption by capillarity is proposed by JP,63-22997,B, JP,63-56876,B, JP,3-21357,B, JP,3-48867,B, JP,57-14091,A, JP,60-61286,A, JP,60-214989,A, JP,61-22983,A, and JP,62-227684,A by using a color-material acceptance layer as porous membrane. Although the color-material acceptance layer of such porous membrane is comparatively high about ink absorptivity, The method of using a porosity inorganic pigment for the pan with which high gloss is not obtained when light was scattered about (diffraction scattering, Mie scattering), and it considers as a record sheet since optical transparency was low since the aperture of porous membrane is too large according to examination of this invention person at a color-material acceptance layer is proposed by JP,55-144172,A, JP,56-148584,A, JP,56-148585,A,

JP,62-273881,A, JP,3-24906,B, JP,60-245588,A, etc. High gloss is not obtained, when light scattering happens and it considers as a record sheet, since the color-material acceptance layer which consists of these porosity inorganic pigments also has a too large particle size of a pigment according to examination of this invention person. Moreover, the approach of using it, making condense the gaseous-phase method silica of 10-30nm of diameters of a primary particle secondarily is proposed by JP,3-56552,B. However, according to examination of this invention person, in the color-material acceptance layer which used the porosity inorganic pigment as which only such a refractive index or particle diameter was specified, since [that a refractive index was large or] particle diameter was large, sufficient transparency was not acquired. Moreover, the record sheet with which the color-material acceptance layer which has a detailed hole using a pseudo-boehmite system particle was formed is indicated by JP,2-276670,A and JP,3-281383,A. According to examination of this invention person, these were good about ink absorptivity, but since a refractive index was as high as about 1.65, sufficient transparency was not acquired. [0007] Therefore, in the sheet for ink jet record, the high (that is, high gloss is obtained) color-material acceptance layer of transparency with good and ink absorptivity is not obtained. Moreover, as a base material of the sheet for ink jet record given in the above-mentioned official report, it is paper of fine quality, a report grade paper, a plastic film, etc. of low glossiness (15% or less), and is opaque, and there is no publication that a glossy base material is used, and these official reports indicate the means for raising ink absorptivity. [0008] In addition to the paper of fine quality of the above-mentioned low glossiness (15% or less), and a report grade paper, from the former, the art paper of high gloss, coat paper, a cast-coated paper, etc. are used as a base material of the sheet for ink jet record. The record form with which surface glossiness has the coat of the polyvinyl alcohol over which the bridge was constructed on 80% or more of cast-coated paper in JP,6-155892,A as a sheet for ink jet record of high gloss, for example is indicated. However, by the coat of the polyvinyl alcohol with which the bridge was constructed over the color-material acceptance layer, although glossiness with such an expensive record form is obtained, as mentioned above, sufficient ink absorptivity is not acquired. Moreover, the record material which prepared the layer which uses a pseudo-boehmite system particle as a color-material acceptance layer on the resin sheet containing white pigments, and has a detailed hole in JP,6-199035,A is indicated. However, highly [glossiness] enough, as the layer of a pseudo-boehmite system particle was mentioned above, although ink absorptivity is good, since its light transmission nature is not enough, it cannot be said to be the record material of high gloss by the resin sheet of this record material.

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Invention] The color-material acceptance layer which consists of a specific silica particle and a water-soluble specific binder is prepared on the opaque base material which has glossiness with the expensive sheet for record of this invention. Since surface glossiness is also high while this secures the outstanding ink receptiveness, the image formed on a color-material acceptance layer of ink jet record etc. is sharp. The polyolefine coat especially used for the base material for the photographic printing papers etc. can be used for a base material, and a sharp image with a very high feeling of gloss can be formed by preparing the above-mentioned color-material acceptance layer.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] this invention person came examination in piles variously, in order to obtain the sheet for ink jet record which can form a quality (it has sharpness by high gloss) image especially. Consequently, it became clear that the color-material acceptance layer which consists of the silica particle and water soluble resin of the specification which shows good ink absorptivity and high light transmission nature was solvable by preparing on an opaque base material with surface high glossiness.

[0010] Therefore, this invention is the sheet for record which can form an image sheet image by ink jet record, thermal transfer recording, or electrophotography record, and it aims at offering the sheet for record which can form a sharp image. Especially this invention is the sheet for record whose ink absorptivity and glossiness which can form an image by ink jet record improved, and it aims at offering the sheet for record which can form a sharp image.

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MEANS

[Means for Solving the Problem] The above-mentioned object is a record sheet which consists of a color-material acceptance layer prepared on an opaque base material and on it, the near front face in which the color-material acceptance layer of this opaque base material is prepared has 70% or more of glossiness, and this color-material acceptance layer can attain it with the sheet for record characterized by being the layer which primary [an average of] particle diameter becomes from a silica particle and water soluble resin 10nm or less.

[0012] The above-mentioned glossiness is JIS. It is the value calculated by measuring according to the approach of a publication to P-8142 (75-degree specular gloss test method of paper and the paper board).

[0013] The desirable mode of the sheet for record of this invention is as follows.

- 1) An opaque base material has the enveloping layer of polyolefine on the near front face in which a color-material acceptance layer is prepared.
- 2) It has the enveloping layer of the polyolefine with which an opaque base material contains white pigments on the near front face in which a color-material acceptance layer is prepared.
- 3) The above-mentioned opaque base material consists of an enveloping layer of paper and the polyolefine (white pigments are contained preferably) prepared in the near front face in which the color-material acceptance layer is prepared.
- 4) The above-mentioned opaque base material consists of an enveloping layer (white pigments are contained preferably) of a white plastic film and the polyolefine prepared in the near front face in which the color-material acceptance layer is prepared.
- 5) The above-mentioned opaque base material contains the metal thin layer prepared in the near front face in which a white plastic film and its color-material acceptance layer are prepared (base material which the white-with metal thin layer plastic film used the metal thin layer as the front face, and was preferably pasted up on one [at least] front face of double-sided polyethylene paper).
- 6) The above-mentioned opaque base material is a base material used for a film photo.
- 7) The above-mentioned color-material acceptance layer has 50 - 80% of voidage.
- 8) The weight ratio of a silica particle 10nm or less and water soluble resin has the above-mentioned primary [an average of] particle diameter in the range of 1.5:1-10:1.
- 9) The above-mentioned primary [an average of] particle diameter is less than (preferably 3-9nm) 10nm.
- 10) The above-mentioned color-material acceptance layer has the pore which has the average diameter of 5-30nm.
- 11) The above-mentioned silica particle is 2 1nm to a front face. It is the silicic anhydride which has the silanol group of 2-3 hits.
- 12) The above-mentioned sheet for record is an object for ink jets.

[0014] The sheet for record of this invention has the basic configuration which consists of a color-material acceptance layer prepared in one front face of an opaque base material and a base material. A color-material acceptance layer may be prepared in both sides of a base material.

[0015] The sheet for record of this invention can be manufactured as follows, for example. As an opaque base material, it is opaque, and if the glossiness of the near front face in which a color-

material acceptance layer is prepared at least is the sheet which it has 70% or more, the sheet of arbitration can be used. Paper of high gloss, such as a baryta paper used for art paper, coat paper, a cast-coated paper, the base material for film photos, etc.; Polyester, such as polyethylene terephthalate (PET) Cellulose ester, such as a nitrocellulose, cellulose acetate, and cellulose acetate butylate With furthermore, plastic films, such as polysulfone, polyphenylene oxide, polyimide, a polycarbonate, and a polyamide The film of the high gloss which this film was made to contain white pigments etc. and carried out opacity to it (performing surface calender processing etc.), or white pigments are contained on the front face of content plastics, such as the above-mentioned paper, the above-mentioned transparence plastic film, or white pigments, — it is — it is — the base material with which the enveloping layer of the polyolefine which is not contained was prepared can be mentioned.

[0016] The special kind paper in which the above-mentioned baryta paper, polyolefine coat paper (a kind of the base material with which the enveloping layer of polyolefine was prepared), or a metal vacuum evaporatio layer currently used as a base material for film photos was prepared can be suitably used by this invention. The enveloping layer of the polyolefine containing polyolefine or white pigments is formed in the near front face in which the color-material acceptance layer of paper and an opaque plastic sheet is prepared, and the opaque base material of this invention has a desirable base material. Even if it uses a transparence plastic sheet, an opaque base material is obtained, in the case of the enveloping layer of the polyolefine with which the enveloping layer of polyolefine contains white pigments, it is **, and it can also use this by this invention. As white pigments, a titanium dioxide, a calcium carbonate, and a zinc oxide can be mentioned. It is a titanium dioxide preferably. Furthermore, a color pigment, a fluorescent brightener, an antioxidant, etc. may be added.

[0017] The paper containing the enveloping layer which consists of a metal thin layer prepared in a polyolefine coat paper, b polyolefine coat plastic film and c white plastic film, and its front face as a desirable example of the opaque base material of this invention can be mentioned.

a) The base material for film photos which consists of an enveloping layer which consists of paper and polyolefine prepared in the front face as polyolefine coat paper, and consists of a polyethylene layer containing the titanium oxide which carried out size press processing of the stencil given in JP,4-149432,A, for example, was prepared in the front face can be mentioned. Especially definition does not have the paper used for polyolefine coat paper, and anythings can be used for it. For example, it can obtain by adding and carrying out paper making of a loading material, a sizing compound, the paper reinforcing agent, etc. by using natural pulp as the main raw material. In this way, polyolefine coat paper can be manufactured by extruding polyolefine on the front face of the obtained stencil, and covering with coating (the extruder and laminator for polyolefines being used). As polyolefin resin, polymers and such mixture, such as high density polyethylene, low density polyethylene, and polypropylene, can be mentioned. High density polyethylene, low density polyethylene, and such mixture are desirable. As for the molecular weight of such polyolefines, 20000-200000 are desirable. The thickness of a polyolefin resin layer has desirable 15-50 micrometers. In polyolefin resin, white pigments, a color pigment, a fluorescent brightener, an antioxidant, etc. may be added.

b) It consists of an enveloping layer which consists of a white plastic film and polyolefine prepared in the front face as a polyolefine coat plastic film, and the base material for film photos which prepared the low-density-polyethylene layer which contains a high-density-polyethylene layer in one side, and contains titanium oxide in another side on the front face of calcium-carbonate content polyester film given in JP,3-214343,A can be mentioned. It is a white plastic film, the plastic film of the above-mentioned polyolefine coat plastic film has polyester resin, such as polyethylene terephthalate, polystyrene, and a desirable polyvinyl chloride as the polymer ingredient, and especially its polyester is desirable. A white plastic film makes for example, the above-mentioned polymer contain an inorganic pigment, and can be created by making a void (detailed air bubbles) form by drawing by mixing other polymers, such as polystyrene, and making a void (detailed air bubbles) form into (JP,3-76727,A) or polyester resin (JP,54-29550,B). And a polyolefine coat can be formed like Above a.

c) The base material for film photos which the white-with metal thin layer plastic film used the

metal thin layer as the front face, and was pasted up, for example on the front face of double-sided polyethylene paper given in JP,6-10242,A as a white plastic film and paper containing the metal thin layer prepared in the front face can be mentioned. Generally metal thin layers are metal vacuum evaporation film, such as aluminum, and the layer of the copolymer containing a vinyl chloride and/or a vinylidene chloride is further formed on it.

[0018] a and b are desirable in these and especially a is desirable. Although the opaque transparence base material of this invention has 70% or more of glossiness, it is desirable. [80% or more of] Its thickness of an opaque transparence base material is easy to deal with a 50-200-micrometer thing and is desirable although there is especially no limit.

[0019] The color-material acceptance layer of this invention can be formed as follows. A color-material acceptance layer can be formed by applying to the front face of a transparence base material, or the front face of the resin film of acid resistibility the coating liquid which distributed non-subtlety particles, such as a silica particle, to the binder, and drying. As a binder of a color-material acceptance layer, it is desirable to use water soluble resin. As an example of water soluble resin, as resin which has hydroxyl as a hydrophilic structural unit polyvinyl alcohol (PVA) and cellulose type resin (methyl cellulose (MC) —) Ethyl cellulose (EC), hydroxyethyl cellulose (HEC), A carboxymethyl cellulose (CMC) etc. chitins and starch as resin which has; ether linkage Polyethylene oxide (PEO), Polyacrylamide (PAAM) and a polyvinyl pyrrolidone (PVP) can be mentioned as resin which has; an amide group, and amide association for polypropylene oxide (PPO), a polyethylene glycol (PEG), and polyvinyl ether (PVE). Moreover, the poly allylamine (PAA) which has the polystyrene sulfonate salt which has; sulfone radical for the polyacrylate which has a carboxyl group as a dissociative radical, maleic resin, alginate, and gelatin, the amino group, an imino group, the 3rd amine, and the 4th ammonium salt, polyethyleneimine (PEI), an epoxidation polyamide (EPAM), polyvinyl pyridine, and gelatin can be mentioned.

[0020] In this invention, 10nm or less (preferably 3-9nm) silica particle is used for the first [an average of] particle diameter as a non-subtlety particle. The refractive index of the silica particle of about 1.45 is still more desirable.

[0021] the hydrogen bond according [a silica particle] to a surface silanol group — particles — adhesion — being easy — a sake — above — an average of 1 — since the structure where voidage is large can be formed when order particle diameter is 10nm or less, it is desirable to use the silica which has such a particle size, and thereby, ink receptiveness and transparency are markedly alike, and improve. A silica particle is divided roughly into a wet method and dry process according to a manufacturing method. The method of a wet method of the acidolysis of a silicate generating active silica, carrying out the polymerization of this moderately, carrying out flocking settling, and obtaining a water silica is in use. One dry-process silica has a method in use of obtaining an anhydrous silica by the approach (arc process) of carrying out heating hydride generation of the approach (flame hydrolysis), silica sand, and corks by elevated-temperature gaseous-phase hydrolysis of silicon halide with an arc in an electric furnace, and oxidizing this with air. In the case of a silicic anhydride (anhydrous silica), especially voidage is easy to form the high three-dimensional structure and is desirable [a silica] although these water silicas and an anhydrous silica show the property from which there was the difference of the consistency of a surface silanol group, the existence of a hole, etc., and it differed. This reason is 2 5-8 pieces/nm, when the consistency of a surface silanol group is a water silica, although it is not clear. Mostly, when it is easy to condense a particle densely (aggregate) and it is one anhydrous silica, it is 2 2-3 pieces/nm. Since it is few, it is presumed that it becomes **** flocculation (FUROKYU rate) and voidage becomes high structure.

[0022] As a non-subtlety particle, colloidal silica, a calcium silicate, a zeolite, a kaolinite, halloysite, a muscovite, talc, a calcium carbonate, a calcium sulfate, boehmite, etc. may be used together in addition to the above-mentioned silica particle.

[0023] A single raw material is sufficient as the silica particle and water soluble resin which mainly constitute this color-material acceptance layer, respectively, and the mixed stock of two or more raw materials is sufficient as them. moreover, the color-material acceptance layer may contain acid alkali as various kinds of mineral and a PH regulator, in order are alike other than this and to raise the dispersibility of a particle, although it mainly consists of the above-mentioned silica particle and

water soluble resin. Moreover, various kinds of surfactants for the object which raises spreading fitness and surface quality may be used. In order to control surface frictional electrification and exfoliation electrification, or in order to adjust surface electric resistance in a xerography, the metallic-oxide particle with a surfactant with ion conductivity or electronic conductivity may be included. Moreover, a mordant may be used in order to fix coloring matter in ink jet record and to raise a water resisting property. Moreover, various kinds of mat agents for the object which reduces a surface friction property may be included. Moreover, various kinds of antioxidants for the object which controls degradation of color material, and an ultraviolet ray absorbent may be included.

[0024] Formation of the above-mentioned color-material acceptance layer can carry out the water solution or water dispersion (coating liquid) containing for example, the above-mentioned resin, a non-subtlety particle, etc. spreading and by carrying out stoving on a transparence base material (film). Spreading can be performed by the well-known methods of application, such as for example, the Ayr doctor coating machine, a bread coating machine, a rod coating machine, a knife coating machine, a squeeze coating machine, a reverse roll coater, and a bar coating machine. Generally desiccation is performed for 0.5 – 30 minutes at 50–180 degrees C. hot air drying equipment — comparatively — low temperature — (— preferably, after drying for 0.5 – 3 minutes by 50 – 90 degree-C(3–8m [/second] wind speed)), it is desirable from the point of the crack prevention at the time of desiccation of the color-material acceptance layer before spreading when especially thickness is thick to dry further comparatively at an elevated temperature (preferably 120–180 degrees C for 5 – 20 minutes). Moreover, it is possible by letting between roll nips pass under heating and application of pressure after spreading and desiccation (for example, a supercalender) and with gloss calender etc. to raise surface smooth nature, transparency, and paint film reinforcement. However, decline in voidage needs to perform such processing by setting up few conditions in order to reduce voidage (namely, in order for ink absorptivity to fall).

[0025] In order [of a color-material acceptance layer] to raise especially transparency (a refractive index is lowered), especially when it is an anhydrous silica, PVA is [whenever / low saponification / (70 – 90% whenever / saponification / it is desirable)] suitable [it is required to form many detailed openings, and / the class of resin combined with a silica particle for that purpose is important, and] in respect of light transmission nature. Although PVA has a hydroxyl group in a repeating unit, this hydroxyl group and the silanol group of a silica particle front face form hydrogen bond, and it is considered with making easy to form the three-dimensional network which makes the aggregated particle of a silica particle a chain unit. It is thought that the color-material acceptance layer of the structure where voidage is high is obtained by this. Thereby, a color-material acceptance layer with high transparency is obtained.

[0026] The above-mentioned color-material acceptance layer (transparent membrane which has many openings) has effect also to membrane structure with the big ratio (PB ratio: weight of the non-subtlety particle to the weight 1 of water soluble resin) of a silica particle and water soluble resin. If PB ratio becomes large, voidage, pore volume, and surface area (per unit weight) will become large. When 10 is exceeded, there are not film reinforcement and effectiveness over the crack at the time of desiccation, less than by 1.5, an opening is closed by resin, voidage decreases and a refractive index becomes high. For this reason, the range of 1.5–10 is suitable for PB ratio. In order to acquire high-speed ink absorptivity with an ink jet printer, as for especially PB ratio, two or more are desirable [to touch directly by hand like especially an OHP film, it is necessary to obtain sufficient film reinforcement, as for especially PB ratio, five or less are desirable, and], therefore the range of 2–5 is still more suitable for PB ratio. For example, the three-dimensional network which makes the aggregated particle of a silica particle a chain unit when the first [an average of] above particle diameter distributes thoroughly [PB ratio / 2–5] in a water solution an anhydrous silica and water soluble resin 10nm or less and carries out spreading desiccation is formed, average pore is 30nm or less, and voidage is 50% or more and pore specific volume 0.5 ml/g. Specific surface area can form easily the porous membrane of the translucency more than 100m²/g above.

[0027] the transparent membrane (color-material acceptance layer) which has the opening of above-mentioned a large number — for example, it can prepare on a base material as follows. The

above-mentioned coating liquid for color-material acceptance stratification the silica particle of 10nm or less of diameters of an average primary particle underwater — adding (an example, 10 – 15 % of the weight) — a high-speed revolution wet colloid mill (an example —) After carrying out distribution for 20 minutes (usually for 10 – 30 minutes) on condition that the high-speed revolution of 10000rpm (usually 5000 – 20000rpm), using a KUREA mix (M Technique Co., Ltd. make), It can obtain by adding a polyvinyl alcohol water solution (it being set to PVA of about 1/3 weight of an example and a silica like), and distributing on the still more nearly same conditions as the above. Thus, the obtained coating liquid is a homogeneity sol and can obtain the color-material acceptance layer which has a three-dimensional network by forming a spreading layer on a base material by the following method of application using this. In addition, the water which is a solvent is evaporated by drying on the occasion of formation of a color-material acceptance layer, after applying the coating liquid of the above-mentioned homogeneity sol on a base material. When the spreading film reaches gelation concentration by this evaporation, wet gel is formed, further, when desiccation advances, porosity xerogel is formed, and the transparent membrane which has the opening of above-mentioned a large number can be obtained.

[0028] Especially the color-material acceptance layer that is the transparent membrane which has the opening of above-mentioned a large number is excellent in ink receptiveness and transparency. The minute record which absorbs ink quickly by capillarity and has neither ink NIJIMI nor ink ***** is not only possible, but in ink jet record, it can paste up firmly the color material in thermal recording, and the toner in electrophotography record. This reason is because color material etc. is firmly fixed according to the geometrical anchor effect to which color material and a toner go underwater in the pore of a porous layer, and originate in a three-dimensional network as that result. In ink jet record, the thickness of a color-material acceptance layer needs to have the absorption capacity which absorbs all drops, and it is necessary to determine this in connection with the voidage of a paint film. For example, the amount of ink 8nl/mm² By the case, if voidage is 60%, film about 15 micrometers or more is needed. In in ink jet record, the range of 10–50 micrometers is desirable. Thus, although the glossiness on the color-material acceptance layer of the sheet for record obtained is also high, as for the glossiness (prescribed by said base material), it is desirable that it is 50% or more, and it is desirable that it is especially 60% or more.

[Translation done.]

* NOTICES *

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2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

EXAMPLE

[Example]

[0030] [Example 1]

(1) Carry out paper making and dry, after carrying out beating of the mixed pulp of the production LBPK70 weight section of an opaque base material, and the NBSP30 weight section to Canadian freeness 300ml by the double disc refiner and adding the following ingredient to this pulp slurry, and it is the basis weight of 180g/m². The stencil was obtained.

[0031]

Pulp 100 Weight Section Epoxidation Behenic Acid Amide The 0.3 weight section Alkyl ketene dimer The 0.4 weight section Cation starch The 1.0 weight section Polyamide polyamine epichlorohydrin The 0.2 weight sections Cationic polyacrylamide The 0.5 weight sections [0032] It is the sizing compound (water solution) of the following presentation in the obtained stencil by sizing press processing 30 g/m² Impregnation adhesion was carried out.

Polyvinyl alcohol 4 Weight section gamma-aminopropyl triethoxysilane The 0.05 weight sections Fluorescent brightener 0.6 Weight section Defoaming agent The 0.005 weight sections [0033] Subsequently, calender processing of the obtained sizing compound adhesion paper was carried out so that it might become 200 micrometers in thickness with a software calender, subsequently calender processing was carried out with the machine calender, and thickness was adjusted to 175 micrometers. Corona discharge treatment is carried out to the rear face (wire side) of a stencil after that, and it is 3 the consistency of 0.98g/cm. Consistency 0.94 g/cm³ which contains 10% of the weight of titanium oxide after coating the thickness of 25 micrometers with polyethylene and carrying out corona discharge treatment to a right face (felt side) The thickness of 30 micrometers was coated with polyethylene and the opaque base material was obtained.

[0034]

(2) Presentation of the coating liquid for color-material acceptance stratification Dry type silica particle (7nm; 10 weight section refractive index: primary [an average of] particle diameter : 1.45; Aerosil A300 (product made from Japanese Aerosil))

Polyvinyl alcohol (it is the 78%; polymerization-degree 4500; 3.3 weight section whenever [saponification] PVA440 (Kuraray Co., Ltd. make))

Ion exchange water A 136 weight sections dry type silica particle is added to ion exchange water (73.3 weight sections), the polyvinyl alcohol water solution (what was dissolved in the remainder 62.7 weight section of ion exchange water) after making it distribute for 20 minutes on condition that 10000rpm using a high-speed revolution wet colloid mill (KUREA mix (M Technique Co., Ltd. make)) — in addition, it distributed on the still more nearly same conditions as the above, aqueous ammonia adjusted pH to 9.2, and the coating liquid for color-material acceptance stratification was obtained.

[0035] The above-mentioned coating liquid was dried for 10 minutes at 100 more degrees C, after using and applying the air knife coater to the right face (on a titanium oxide content polyethylene layer) of said opaque base material and drying for 1 minute at 70 degrees C (5m [/second] wind speed) with hot air drying equipment. Thereby, desiccation thickness formed the color-material acceptance layer which is 30 micrometers.

[0036] The sheet for record with which the color-material acceptance layer was prepared in the

opaque base material as mentioned above was obtained.

[0037] In the [example 2] example 1, the sheet for record was produced like the example 1 except having used the following base material as said opaque base material.

[0038] (1) Biaxial stretching of the polyester resin (PET) which contained the calcium carbonate with a production mean particle diameter [of an opaque base material] of 0.9 micrometers 15% of the weight was carried out, and it obtained to white polyester film of 3 and SRa0.17micrometer the consistency of 0.9g/cm. It is the solvent solution of the polyester resin which kneaded tin oxide 50% of the weight to both sides of this white polyester film at solid content 0.3g/m² It is the surface electric resistance after applying and drying 5x10⁸ to 5x10⁹ The antistatic layer of omega was formed.

[0039] After carrying out corona discharge treatment to both sides of this film, melting extrusion of the high density polyethylene (consistency 0.960g/cm³, 10 MI=13g /, minutes) was carried out with the resin thickness of 30 micrometers using the melting extruder, and one antistatic layer top was covered with the resin layer of polyethylene (this field is called a rear face). Next, melting extrusion of the low density polyethylene (consistency 0.923 g/cm³, 10 MI=7g /, minutes) which used the melting extruder and contained the ultramarine blue of 15 % of the weight of anatase mold titanium dioxides and a minute amount on another [which did not prepare a resin layer] antistatic layer was carried out with the resin thickness of 32 micrometers, and it covered with the resin layer which has a glossy surface (this field is called a right face).

[0040] After carrying out corona discharge treatment of the high-density-polyethylene resin stratification plane on the back, the aluminum oxide (alumina ZORU -100, Nissan Chemical Industries, Ltd. make) and the silicon dioxide (the Snow tex -0, Nissan Chemical Industries, Ltd. make) were distributed in water by the weight ratio as an antistatic agent one half (alumina ZORU-100 / Snow tex -0), and it applied so that it might be set to 0.2g/m² by the weight after desiccation.

[0041] The opaque base material was obtained as mentioned above.

[0042] In the [example 3] example 1, the sheet for record was produced like the example 1 except having used the following base material as said opaque base material.

[0043] (1) The polyethylene terephthalate film with a thickness of 25 micrometers filled up with the silica of 3 micrometers of production mean diameters of an opaque base material 2% of the weight has been arranged in vacuum deposition, vacuum deposition was performed on conditions with a degree of vacuum of 10 to 4 torrs, and the vacuum-plating-of-aluminium film whose thickness is 600A on the surface of a film was formed. The adhesives of the following presentation are diluted with ethyl acetate on the front face of this vacuum evaporatio film, and the coverage after desiccation is 5 g/m². It applied so that it might become, and it dried in oven for 2 minutes at 100 degrees C.

(Adhesives presentation)

Vinyl chloride / vinylidene-chloride / vinyl acetate/ 56 Weight section Maleic-anhydride copolymer Tolyene diisocyanate 37 Weight section Trimethylol propane adduct Epoxidation aliphatic alkylester (molecular weight 350 [about]) 7 Weight ***** was carried out and the film with a vacuum evaporatio layer was obtained.

[0044] After carrying out beating of the mixed pulp of the LBPK80 weight section and the NBSP20 weight section to Canadian freeness 300ml by the double disc refiner and adding the following ingredient to this pulp slurry, paper making is carried out and it dries, and it is basis weight 160 g/m². The stencil was obtained. Consistencies are 1.0 g/cm³ by the ASHIN calender. It adjusted.

[0045]

Pulp 100 Weight Section Sodium Stearate The 1.0 weight section Anion polyacrylamide The 0.5 weight section Aluminum sulfate The 1.5 weight section Polyamide polyamine epichlorohydrin The 0.5 weight sections Alkyl ketene dimer The 0.5 weight sections [0046] After carrying out corona discharge treatment of one side of the obtained stencil, melting extrusion of the low density polyethylene (consistency 0.923g/cm³, 10 MI=7g /, minutes) was carried out with the resin thickness of 30 micrometers using the melting extruder, and one field (right face) of paper was covered with the resin layer of polyethylene. Next, after carrying out corona discharge treatment of another [which did not prepare a resin layer] field, melting extrusion of the high density

polyethylene (consistency 0.950 g/cm³, 10 MI=8g /, minutes) was carried out with the resin thickness of 30 micrometers using the melting extruder, and it covered with the resin layer (this field is called a rear face). In this way, both sides produced the paper laminated with polyethylene. [0047] Next, the coverage after drying the polyurethane system 2 liquid type adhesives of the following presentation on the front face of the side which did not prepare the vacuum evaporatio layer of the film with a vacuum evaporatio layer produced previously is 3g/m². It applied so that it might become, and it dried in oven for 2 minutes at 100 degrees C.

(Adhesives presentation)

Pori Bond AY-651A 100 Weight section (Sanyo Chemical Industries, Ltd. make)

Pori Bond AY-651C 15 Weight section (Sanyo Chemical Industries, Ltd. make)

This spreading side and the low-density-polyethylene side of the paper which both sides laminated with polyethylene were doubled, and heating sticking by pressure was carried out by pressure 20 kg/cm. It produced.

[0048] The opaque base material was obtained as mentioned above. The field which has a vacuum evaporatio layer is a right face.

[0049] In the [example 1 of comparison] example 1, the sheet for record was produced like the example 1 except having used the PPC form (regular paper for electrophotography) as an opaque base material.

[0050] A commercial cast-coated paper (trade name: MARIESUTO,; by Hokuetsu Paper Mills, Ltd. 80 - 88% of glossiness, the U.S. tsubo 210 - 250 g/m²) is used as a [example 2 of comparison] opaque base material, and the coverage after drying the coating liquid of the following presentation on this is 5 g/m². It applied and dried so that it might become.

(2) Presentation of the coating liquid for color-material acceptance stratification Polyvinyl alcohol (it is the 78 - 81% 7 weight section whenever [saponification] PVA420 (Kuraray Co., Ltd. make))

Water 30 Weight section [0051] The sheet for record with which the color-material acceptance layer was prepared in the opaque base material as mentioned above was obtained.

[0052] About the sheet for record obtained above, the ink jet fitness was evaluated by the following measuring methods.

(1) With the ink rate-of-absorption ink jet printer (PIXEL JET; product made from Canon), the contact press of the paper was carried out immediately after solid printing of the black to the sheet for record (after about 10 seconds), and it judged as follows by the existence of the imprint to the paper of ink.

AA: Ink was not imprinted by paper.

CC: Ink was imprinted by paper.

(2) viewing estimated the sharpness (an image — Sharp) of an image for the image printed by the sheet for record using the same printer as the sharpness above of an image.

AA: Sharpness good BB:sharpness good CC: Poor sharpness [0053] The glossiness of the opaque base material of an example and the example of a comparison and the sheet for record was measured for the following business.

(3) About the opaque base material and the sheet for record which were obtained in the glossiness above-mentioned example and the example of a comparison, it is JIS. According to the approach of a publication, glossiness was measured to P-8142 (75-degree specular gloss test method of paper and the paper board). That is, six test pieces were created, respectively and it measured using the glossmeter (a digital deflection glossmeter, Suga Test Instruments Co., Ltd. make). The average of the obtained measured value was made into glossiness.

[0054]

[A table 1]

Table 1 ————— . the **** ** _***** ** ***** method
***** ** ** - ** ** machine O ***** **** people *****; —————*****
**** . **** . **** . ***** . ***** . Pit machine . ***** . **** . **** . **** .
*****" ***** . **** . **** . ** . ***** . **** . **** . **** .

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(54)【発明の名称】 記録用シート

(57)【要約】

【目的】 本発明はインクジェット記録等により画像を形成することができる記録用シートであって、インク吸収性及び光沢度の向上した記録用シートを提供する。

【構成】 不透明支持体及びその上に設けられた色材受容層からなる記録シートであって、該不透明支持体の色材受容層の設けられる側の表面が、70%以上の光沢度を有し、かつ該色材受容層が、平均1次粒子径が10nm以下のシリカ粒子と水溶性樹脂からなる層であることを特徴とする記録用シート。

【特許請求の範囲】

【請求項 1】 不透明支持体及びその上に設けられた色材受容層からなる記録シートであって、該不透明支持体の色材受容層の設けられる側の表面が 70%以上の光沢度を有し、かつ該色材受容層が、平均 1 次粒子径が 10 nm 以下のシリカ粒子と水溶性樹脂からなる層であることを特徴とする記録用シート。

【請求項 2】 該不透明支持体が、色材受容層の設けられる側の表面にポリオレフィンの被覆層を有する請求項 1 に記載の記録用シート。

【請求項 3】 該不透明支持体が、色材受容層の設けられる側の表面に、白色顔料を含有するポリオレフィンの被覆層を有する請求項 1 に記載の記録用シート。

【請求項 4】 該不透明支持体が、紙とその色材受容層の設けられる側の表面に設けられた白色顔料を含有するポリオレフィンの被覆層からなる請求項 1 に記載の記録用シート。

【請求項 5】 該不透明支持体が、白色プラスチックフィルムとその色材受容層の設けられる側の表面に設けられた白色顔料を含有するポリオレフィンの被覆層ポリオレフィンの被覆層からなる請求項 1 に記載の記録用シート。

【請求項 6】 該不透明支持体が、白色プラスチックフィルムとその色材受容層の設けられる側の表面に設けられた金属薄層を含む請求項 1 に記載の記録用シート。

【請求項 7】 該色材受容層が、空隙率 50～80%を有する請求項 1 に記載の記録用シート。

【請求項 8】 該平均 1 次粒子径が 10 nm 以下のシリカ微粒子と水溶性樹脂との重量比が 1.5 : 1～10 : 1 の範囲にある請求項 1 に記載の記録用シート。

【請求項 9】 インクジェット記録用シートである請求項 1 に記載の記録用シート。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は色材を用いて画像形成するのに適した記録用シートに関するものである。特に、インクジェット記録により高光沢の画像シートを形成するための記録用シートに関する。

【0002】

【従来の技術】 近年、情報産業の急速な発展に伴い、種々の情報処理システムが開発され、また、それぞれの情報システムに適した記録方法及び装置も開発され、採用されている。このような記録方法の中で、インクジェットあるいはプロッターを用いたインク記録、及び溶融型色材あるいは昇華型色材を用いた感熱転写記録においては、使用する装置が、軽量かつコンパクト化され、騒音もなく、操作性、保守性にも優れたものとなっている。さらに、このような記録方法で使用する装置はカラー化も容易であることから、最近広く使用されている。また、従来の電子写真方式の記録においてもカラー化が進

み高解像度でフルカラーのプリンター、複写機が開発され商品化されてきている。

【0003】 インクジェット方式は各種の方式が開発されているが、物性的には大きく分けて水溶性色素を含む色素溶液（水性インク）を用いる方法、及び油溶性色素を含む色素溶液（油性インク）を用いる方法、そして色素を含有した低融点固形ワックス（ワックスインク）を熱溶融させて用いる方法の三種がある。主流は水性インクを使用するタイプである。何れにしても記録用シート上に液状の微粒滴を吐出させて画像を形成する方法である。

【0004】 上記のインクジェット記録においては、精細な画像を得る上で液状インクを早く吸収し、インクしみやインク溜まりの無いことが要求される。更に、インクジェット記録用シートに画像を形成したハードコピーは、上記の精細な画像を有すると共に光沢度が高いことも要求される。即ち、ハードコピーの理想である銀塩写真を考えた場合、高い光沢度は達成すべき重要な課題である。

【0005】 上記インク吸収性を改善するために、従来から様々な提案がなされている。例えば、インクジェット記録の場合では、特開昭 55-146786 号公報に色材吸収層に吸水性ポリマーの使用、特開昭 56-80489 号公報に溶解性又は膨潤性物質の使用が提案され、また多数のポリマー系（ポリビニルアルコール（PVA）、ポリビニルピロリドン（PVP）、ポリエチレンオキシド（PEO）、カルボキシメチルセルロース（CMC））の使用が提案されている。しかしながら、これらの吸収性材料はポリマーの親水性基あるいは解離性基による水性インクの浸透効果を利用したものであり、このため膜を厚くしても十分なインク吸収速度が得られず、また混色染みの抑制が不充分であった。

【0006】 また色材受容層を多孔質膜にすることにより毛細管現象でインク吸収させる方法が、特公昭 63-22997 号公報、特公昭 63-56876 号公報、特公平 3-21357 号公報、特公平 3-48867 号公報、特開昭 57-14091 号公報、特開昭 60-61286 号公報、特開昭 60-214989 号公報、特開昭 61-22983 号公報及び特開昭 62-227684 号公報に提案されている。これらの多孔質膜の色材受容層は、インク吸収性については比較的高いものであるが、本発明者の検討によると多孔質膜の孔径が大き過ぎるため光が散乱（回折散乱、ミー散乱）されて光学的透明性が低いことから、記録シートとした場合に高光沢が得られないさらに、色材受容層に多孔質無機顔料を用いる方法が、特開昭 55-144172 号公報、特開昭 56-148584 号公報、特開昭 56-148585 号公報、特開昭 62-273881 号公報、特公平 3-24906 号公報及び特開昭 60-245588 号公報等に提案されている。これらの多孔質無機顔料からなる色

材受容層も、本発明者の検討によると顔料の粒径が大き過ぎるため光散乱が起り、記録シートとした場合に高光沢が得られない。また一次粒子径10～30nmの気相法シリカを二次凝集させて使用する方法が特公平3-56552号公報に提案されている。しかしながら、本発明者の検討によると、このような屈折率あるいは粒子径のみ規定された多孔質無機顔料を使用した色材受容層では、屈折率が大いあるいは粒子径が大いため十分な透明性が得られなかった。また、擬ベーマイト系微粒子を用いて微細な空孔を有する色材受容層が形成された記録シートが、特開平2-276670号公報及び特開平3-281383号公報に記載されている。これらは、本発明者の検討によると、インク吸収性については良好であるが、屈折率が約1.65と高い為、十分な透明性が得られなかった。

【0007】従って、インクジェット記録用シートにおいては、インク吸収性が良好で且つ透明性の高い（即ち、高光沢が得られる）色材受容層は得られていない。また上記公報に記載のインクジェット記録用シートの支持体としては、低光沢度（15%以下）の上質紙、中質紙やプラスチックフィルム等で、不透明で光沢のある支持体を使用するとの記載はなく、これらの公報はインク吸収性を向上させるための手段を開示するものである。

【0008】従来から、インクジェット記録用シートの支持体としては、上記低光沢度（15%以下）の上質紙、中質紙に加えて、高光沢のアート紙、コート紙、キャストコート紙、等も使用されている。高光沢のインクジェット記録用シートとしては、例えば、特開平6-155892号公報に、表面光沢度が80%以上のキャストコート紙の上に架橋されたポリビニルアルコールの皮膜を有する記録用紙が開示されている。しかしながら、このような記録用紙は高い光沢度が得られるが、色材受容層が架橋されたポリビニルアルコールの皮膜では、前述したように十分なインク吸収性が得られない。また、特開平6-199035号公報には、白色顔料を含む樹脂シート上に色材受容層として擬ベーマイト系微粒子を用いて微細な空孔を有する層を設けた記録材が開示されている。しかしながら、この記録材の樹脂シートは光沢度が十分に高くなく、擬ベーマイト系微粒子の層は、前述したようにインク吸収性は良好であるが光透過性が充分でないことから、高光沢の記録材とは言えない。

【0009】

【発明が解決しようとする課題】本発明者は、特に高品質な（高光沢で鮮鋭さを有する）画像を形成することができるインクジェット記録用シートを得るために種々検討を重ねてきた。その結果、良好なインク吸収性と高い光透過性を示す特定のシリカ微粒子と水溶性樹脂からなる色材受容層を、表面の光沢度が高い不透明支持体上に設けることにより解決できることが判明した。

【0010】従って、本発明はインクジェット記録、熱

転写記録又は電子写真記録により画像シート画像を形成することができる記録用シートであって、鮮鋭な画像を形成することができる記録用シートを提供することを目的とする。特に、本発明はインクジェット記録により画像を形成することができるインク吸収性及び光沢度が向上した記録用シートであって、鮮鋭な画像を形成することができる記録用シートを提供することを目的とする。

【0011】

【課題を解決するための手段】上記目的は、不透明支持体及びその上に設けられた色材受容層からなる記録シートであって、該不透明支持体の色材受容層の設けられる側の表面が70%以上の光沢度を有し、かつ該色材受容層が、平均1次粒子径が10nm以下のシリカ粒子と水溶性樹脂からなる層であることを特徴とする記録用シートによって達成することができる。

【0012】上記光沢度は、JIS P-8142（紙及び板紙の75度鏡面光沢度試験方法）に記載の方法に従って測定することにより求められる値である。

【0013】本発明の記録用シートの好ましい態様は下記のとおりである。

- 1) 不透明支持体が、色材受容層の設けられる側の表面にポリオレフィンの被覆層を有する。
- 2) 不透明支持体が、色材受容層の設けられる側の表面に、白色顔料を含有するポリオレフィンの被覆層を有する。
- 3) 上記不透明支持体が、紙とその色材受容層の設けられる側の表面に設けられたポリオレフィン（好ましくは白色顔料を含有する）の被覆層からなる。
- 4) 上記不透明支持体が、白色プラスチックフィルムとその色材受容層の設けられる側の表面に設けられたポリオレフィンの被覆層（好ましくは白色顔料を含有する）からなる。
- 5) 上記不透明支持体が、白色プラスチックフィルムとその色材受容層の設けられる側の表面に設けられた金属薄層を含む（好ましくは両面ポリエチレン紙の少なくとも一方の表面に金属薄層付き白色プラスチックフィルムが金属薄層を表面にして接着された支持体）。
- 6) 上記不透明支持体が、銀塩写真に使用される支持体である。
- 7) 上記色材受容層が、空隙率50～80%を有する。
- 8) 上記平均1次粒子径が10nm以下のシリカ微粒子と水溶性樹脂との重量比が1.5:1～10:1の範囲にある。
- 9) 上記平均1次粒子径が、10nm未満（好ましくは3～9nm）である。
- 10) 上記色材受容層が、5～30nmの平均直径を有する細孔を有する。
- 11) 上記シリカ微粒子が、表面に1nm²当たり2～3個のシラノール基を有する無水珪酸である。
- 12) 上記記録用シートがインクジェット用である。

【0014】本発明の記録用シートは、不透明支持体、及び支持体の一方の表面に設けられた色材受容層とからなる基本構成を有する。色材受容層は支持体の両面に設けても良い。

【0015】本発明の記録用シートは、例えば下記のようにして製造することができる。不透明支持体としては、不透明で少なくとも色材受容層が設けられる側の表面の光沢度が70%以上有するシートであれば、任意のシートを用いることができる。アート紙、コート紙、キャストコート紙、銀塩写真用支持体等に使用されるパラ
10 イタ紙等の高光沢の紙；ポリエチレンテレフタレート（PET）等のポリエステル類、ニトロセルロース、セルロースアセテート及びセルロースアセテートブチレート等のセルロースエステル類、更にポリスルホン、ポリフェニレンオキサイド、ポリイミド、ポリカーボネート、ポリアミド等のプラスチックフィルムで、このフィルムに白色顔料等を含有させて不透明した高光沢の（表面カレンダー処理等を行なって）フィルム、あるいは上記紙、上記透明プラスチックフィルムまたは白色顔料等
20 含有プラスチックの表面に、白色顔料を含有するあるいは含有しないポリオレフィンの被覆層が設けられた支持体等を挙げることができる。

【0016】銀塩写真用支持体として使用されている、上記パライタ紙、ポリオレフィンコート紙（ポリオレフィンの被覆層が設けられた支持体の一種）あるいは金属蒸着層等が設けられた特種紙等は、本発明で好適に使用することができる。本発明の不透明支持体は、紙、不透明プラスチックシートの色材受容層の設けられる側の表面に、ポリオレフィンのみ、または白色顔料を含有する
30 ポリオレフィンの被覆層が形成され支持体が好ましい。ポリオレフィンの被覆層が白色顔料を含有するポリオレフィンの被覆層の場合は、透明プラスチックシートを用いても不透明支持体が得られるので、これも本発明で使用する
ことができる。白色顔料としては、二酸化チタン、炭酸カルシウム及び酸化亜鉛を挙げることができる。好ましくは二酸化チタンである。さらに着色顔料、蛍光増白剤、酸化防止剤等を添加しても良い。

【0017】本発明の不透明支持体の好ましい例としては、a) ポリオレフィンコート紙、b) ポリオレフィン
40 コート・プラスチックフィルム及びc) 白色プラスチックフィルムとその表面に設けられた金属薄層からなる被覆層を含む紙を挙げることができる。

a) ポリオレフィンコート紙としては、紙とその表面に設けられたポリオレフィンからなる被覆層からなるもので、例えば特開平4-149432号公報に記載の原紙をサイズプレス処理し、その表面に設けられた酸化チタンを含有するポリエチレン層からなる銀塩写真用支持体を挙げることができる。ポリオレフィンコート紙に使用
50 される紙は、特に限定はなくどのようなものでも使用することができる。例えば、天然パルプを主原料として、

填料、サイズ剤、紙力増強剤等を添加して、抄紙することにより得ることができる。こうして得られた原紙の表面にポリオレフィンを押し出しコーティング（例えば、ポリオレフィン用の押し出し機とラミネーターを使用）により被覆することによってポリオレフィンコート紙を製造することができる。ポリオレフィン樹脂としては、高密度ポリエチレン、低密度ポリエチレン、ポリプロピレン等の重合体及びこれらの混合物を挙げることができる。高密度ポリエチレン、低密度ポリエチレン及びこれらの混合物が好ましい。これらのポリオレフィンの分子量は20000～200000が好ましい。ポリオレフィン樹脂層の層厚は15～50μmが好ましい。ポリオレフィン樹脂中には、白色顔料、着色顔料、蛍光増白剤、酸化防止剤等を添加しても良い。

b) ポリオレフィンコート・プラスチックフィルムとしては、白色プラスチックフィルムとその表面に設けられたポリオレフィンからなる被覆層からなるもので、例えば特開平3-214343号公報記載の炭酸カルシウム含有ポリエステルフィルムの表面に、一方に高密度ポリエチレン層、もう一方に酸化チタンを含む低密度ポリエチレン層を設けた銀塩写真用支持体を挙げることができる。上記ポリオレフィンコート・プラスチックフィルムのプラスチックフィルムは白色プラスチックフィルムで、そのポリマー材料としてポリエチレンテレフタレート等のポリエステル樹脂、ポリスチレン、ポリ塩化ビニルが好ましく、特にポリエステルが好ましい。白色プラスチックフィルムは、例えば、上記ポリマーに無機顔料を含有させ、延伸によりボイド（微細な気泡）を形成させることにより（特開平3-76727号公報）、あるいは
30 ポリエステル樹脂中にポリスチレン等の他のポリマーを混合してボイド（微細な気泡）を形成させることにより（特公昭54-29550号公報）作成することができる。そしてポリオレフィンコートは上記a)と同様にして形成することができる。

c) 白色プラスチックフィルムとその表面に設けられた金属薄層を含む紙としては、例えば特開平6-10242号公報記載の両面ポリエチレン紙の表面に金属薄層付き白色プラスチックフィルムが金属薄層を表面にして接着された銀塩写真用支持体を挙げることができる。金属薄層は、一般にアルミニウム等の金属蒸着膜であり、更にその上に塩化ビニル及び／又は塩化ビニリデンを含む共重合体の層が形成される。

【0018】これらの中でa)とb)が好ましく、特にa)が好ましい。本発明の不透明透明支持体は、70%以上の光沢度を有するが、80%以上が好ましい。不透明透明支持体の厚さは、特に制限はないが、50～200μmのものが取り扱い易く好ましい。

【0019】本発明の色材受容層は下記のように形成することができる。シリカ微粒子等の無機微粒子をバインダーに分散した塗布液を、透明支持体の表面あるいは反

射防止性の樹脂膜の表面に塗布、乾燥することにより、色材受容層を形成することができる。色材受容層のバインダーとしては、水溶性樹脂を使用することが好ましい。水溶性樹脂の例としては、親水性構造単位としてヒドロキシル基を有する樹脂として、ポリビニルアルコール（PVA）、セルロース系樹脂（メチルセルロース（MC）、エチルセルロース（EC）、ヒドロキシエチルセルロース（HEC）、カルボキシメチルセルロース（CMC）等）、キチン類及びデンプンを；エーテル結合を有する樹脂としてポリエチレンオキサイド（PEO）、ポリプロピレンオキサイド（PPO）、ポリエチレングリコール（PEG）及びポリビニルエーテル（PVE）を；そしてアミド基またはアミド結合を有する樹脂としてポリアクリルアミド（PAAM）およびポリビニルピロリドン（PVP）を挙げることができる。また、解離性基としてカルボキシル基を有するポリアクリル酸塩、マレイン酸樹脂、アルギン酸塩及びゼラチン類を；スルホン基を有するポリスチレンスルホン酸塩、アミノ基、イミノ基、第3アミン及び第4アンモニウム塩を有するポリアリルアミン（PAA）、ポリエチレンジアミン（PEI）、エポキシ化ポリアミド（EPAM）、ポリビニルピリジン及びゼラチン類を挙げることができる。

【0020】本発明では、無機微粒子として平均一次粒子径が10nm以下（好ましくは3～9nm）シリカ微粒子が使用される。さらにその屈折率が約1.45のシリカ微粒子が好ましい。

【0021】シリカ粒子は、表面のシラノール基による水素結合により粒子同士が付着やすい為、上記のように平均一次粒子径が10nm以下の場合に於いて空隙率の大きい構造を形成することができるので、このような粒径を有するシリカを用いることが好ましく、これによりインク受容性及び透明性が格段に向上する。シリカ粒子は製造法により湿式法と乾式法に大別される。湿式法はケイ酸塩の酸分解により活性シリカを生成し、これを適度に重合させ凝集沈降させ含水シリカを得る方法が主流である。一方の乾式法シリカは、ハロゲン化珪素の高温気相加水分解による方法（火炎加水分解法）、ケイ砂とコークスを電気炉中でアークにより加熱還元気化し、これを空気で酸化する方法（アーク法）で無水シリカを得る方法が主流である。これらの含水シリカ及び無水シリカは表面のシラノール基の密度、空孔の有無等の相違があり異なった性質を示すが、無水珪酸（無水シリカ）の場合に特に空隙率が高い三次元構造を形成し易く好ましい。この理由は明確ではないが、表面のシラノール基の密度が含水シリカの場合、5～8個/nm²と多く粒子が密に凝集（アグリゲート）し易く、一方の無水シリカの場合は2～3個/nm²と少ない為、粗な軟凝集（フロキュレート）となり空隙率が高い構造になると推定される。

【0022】無機微粒子としては、上記シリカ微粒子以外に、コロイダルシリカ、珪酸カルシウム、ゼオライト、カオリナイト、ハロイサイト、白雲母、タルク、炭酸カルシウム、硫酸カルシウム、ペーマイト等を併用しても良い。

【0023】この色材受容層を主として構成するシリカ微粒子や水溶性樹脂は、それぞれ単一素材でも良いし複数の素材の混合系でもよい。また色材受容層は主として上記シリカ微粒子と水溶性樹脂からなるがそれ以外に粒子の分散性を高める為に各種の無機塩類、PH調整剤として酸アルカリを含んでいてもよい。また塗布適性や表面品質を高める目的で各種の界面活性剤を使用してもよい。表面の摩擦帯電や剥離帯電を抑制する為、あるいは電子写真法に於いて表面電気抵抗を調整する為にイオン導電性を持つ界面活性剤や電子導電性を持つ金属酸化物微粒子を含んでいてもよい。またインクジェット記録に於いて色素を固定し耐水性を高める目的で媒染剤を使用してもよい。また表面の摩擦特性を低減する目的で各種のマット剤を含んでいてもよい。また色材の劣化を抑制する目的で各種の酸化防止剤、紫外線吸収剤を含んでいてもよい。

【0024】上記色材受容層の形成は、例えば、上記樹脂、無機微粒子等を含む水溶液又は水分散液（塗布液）を透明支持体（フィルム）上に塗布、加熱乾燥することにより実施することができる。塗布は、例えばエアードクターコーター、ブレードコーター、ロッドコーター、ナイフコーター、スクイズコーター、リバースロールコーター、バーコーター等の公知の塗布方法で行なうことができる。乾燥は、一般に、50～180℃で0.5～30分間行なわれる。熱風乾燥機により比較的低温で（好ましくは、50～90℃（風速3～8m/秒））で0.5～3分間乾燥した後、更に比較的高温（好ましくは、120～180℃で5～20分間）で乾燥することが、特に膜厚が厚い時の塗布前の色材受容層の乾燥時のフレ防止の点から好ましい。また、塗布、乾燥後、例えばスーパーカレンダー、グロスカレンダー等で加熱、加圧下にロールニップ間を通すことにより、表面平滑性、透明性及び塗膜強度を向上させることが可能である。しかしながら、このような処理は空隙率を低下させるため（即ちインク吸収性が低下するため）、空隙率の低下が少ない条件を設定して行なう必要がある。

【0025】色材受容層の特に透明性を向上させる（屈折率を下げる）ためには、微細な空隙を多数形成することが必要であり、そのためにはシリカ微粒子に組み合わせる樹脂の種類が重要であり、無水シリカの場合は、特に低鹼化度（好ましくは鹼化度70～90%）PVAが光透過性の点で好適である。PVAは、繰返し単位に水酸基を有するが、この水酸基とシリカ粒子表面のシラノール基が水素結合を形成して、シリカ粒子の二次粒子を鎖単位とする三次元網目構造を形成し易くすると考えら

れる。これにより、空隙率の高い構造の色材受容層が得られると考えられる。これにより、透明性の高い色材受容層が得られる。

【0026】上記色材受容層（多数の空隙を有する透明膜）は、シリカ微粒子と水溶性樹脂の比率（PB比：水溶性樹脂の重量1に対する無機微粒子の重量）は膜構造にも大きな影響を与える。PB比が大きくなると空隙率、細孔容積、表面積（単位重量当たり）が大きくなる。10を超えた場合は、膜強度、乾燥時のひび割れに対する効果が無く、1.5未満では空隙が樹脂で塞がれ空隙率が減少して屈折率が高くなる。この為、PB比は1.5～10の範囲が好適である。特にOHPフィルムのように手で直接触る場合は充分な膜強度を得る必要があり、PB比は5以下が特に好ましく、またインクジェットプリンターで高速インク吸収性を得る為にはPB比は2以上が特に好ましく、従ってPB比は2～5の範囲がさらに好適である。例えば、上述のような平均一次粒子径が10nm以下の無水シリカと水溶性樹脂をPB比が2～5で水溶液中に完全に分散し塗布乾燥した場合、シリカ粒子の二次粒子を鎖単位とする三次元網目構造が形成され、平均細孔が30nm以下、空隙率が50%以上、細孔比容積0.5ml/g以上、比表面積が100m²/g以上の透光性の多孔質膜を容易に形成することができる。

【0027】上記多数の空隙を有する透明膜（色材受容層）は、例えば下記のようにして支持体上に設けることができる。上記色材受容層形成用塗布液は、平均一次粒子径10nm以下のシリカ微粒子を、水中に添加して（例、10～15重量%）、高速回転湿式コロイドミル（例、クレアミックス（エム・テクニク（株）製））を用いて、例えば10000rpm（通常は5000～20000rpm）の高速回転の条件で20分間（通常は10～30分間）分散させた後、ポリビニルアルコール水溶液（例、シリカの1/3程度の重量のPVAとなるように）を加えて更に、上記と同じ条件で分散を行なうことにより得ることができる。このようにして得られた塗布液は、均一ゾルであり、これを用いて下記の塗布方法により、支持体上に塗布層を形成することにより、

パルプ
エポキシ化ベヘン酸アミド
アルキルケテンダイマー
カチオンスターチ
ポリアミドポリアミンエピクロロヒドリン
カチオン性ポリアクリルアミド

【0032】得られた原紙に、下記の組成のサイズ剤（水溶液）をサイジングプレス処理により、30g/m

ポリビニルアルコール
γ-アミノプロピルトリエトキシシラン
蛍光増白剤
消泡剤

三次元網目構造を有する色材受容層を得ることができる。なお、色材受容層の形成に際しては、上記均一ゾルの塗布液を支持体上に塗布した後乾燥することにより、溶媒である水を蒸発させる。この蒸発により塗布膜がゲル化濃度に達した時点でウェットゲルが形成され、更に、乾燥が進行することにより多孔質キセロゲルが形成され、上記多数の空隙を有する透明膜を得ることができる。

【0028】上記多数の空隙を有する透明膜である色材受容層は、特にインク受容性及び透明性に優れている。インクジェット記録において、毛細管現象によって急速にインクを吸収し且つインクニジミやインク溜まりの無い精細な記録が可能であるばかりでなく、感熱記録における色材、そして電子写真記録におけるトナーを強固に接着できる。この理由は、色材やトナーが多孔質層の細孔内にもぐり込み、その結果として三次元網目構造に起因する形状的なアンカー効果により色材等を強固に固定する為である。色材受容層の層厚は、インクジェット記録の場合は液滴を全て吸収するだけの吸収容量をもつ必要があり、これは、塗膜の空隙率との関連で決定する必要がある。例えばインク量が8nl/mm²の場合で、空隙率が60%であれば約15μm以上の膜が必要となる。インクジェット記録の場合の場合は、10～50μmの範囲が好ましい。このようにして得られる記録用シートの色材受容層上の光沢度も高いものであるが、その光沢度（前記支持体で規定された）は50%以上であることが好ましく、特に60%以上であることが好ましい。

【0029】

【実施例】

【0030】[実施例1]

(1) 不透明支持体の作製

LBPK70重量部とNBSP30重量部の混合パルプをダブルディスクリファイナーによりカナディアンフリーネス300mlに叩解し、このパルプスラリーに下記の材料を添加した後、抄紙して乾燥し、坪量180g/m²の原紙を得た。

【0031】

100	重量部
0.3	重量部
0.4	重量部
1.0	重量部
0.2	重量部
0.5	重量部

² 含浸付着させた。

4	重量部
0.05	重量部
0.6	重量部
0.005	重量部

【0033】次いで、得られたサイズ削付着紙を、ソフトカレンダーにより厚さ200 μ mとなるようにカレンダー処理し、次いでマシンカレンダーによりカレンダー処理して厚さを175 μ mに調整した。その後原紙の裏面（ワイヤー面）にコロナ放電処理し、密度0.98g/cm³のポリエチレンを25 μ mの厚さにコーティング

(2) 色材受容層形成用塗布液の組成

乾式シリカ微粒子（平均1次粒子径：7nm； 10重量部

屈折率：1.45；エアロジルA300（日本エアロジル（株）製））

ポリビニルアルコール（鹸化度78%；重合度4500； 3.3重量部

PVA440（クラレ（株）製））

イオン交換水

136重量部

乾式シリカ微粒子を、イオン交換水（73.3重量部）に添加して、高速回転湿式コロイドミル（クレアミックス（エム・テクニク（株）製））を用いて、10000rpmの条件で20分間分散させた後、ポリビニルアルコール水溶液（イオン交換水の残り62.7重量部に溶解させたもの）を加えて、更に上記と同じ条件で分散を行ない、アンモニア水でpHを9.2に調整して、色材受容層形成用塗布液を得た。

【0035】上記塗布液を、前記不透明支持体のおもて面（酸化チタン含有ポリエチレン層上）に、エアナイフコーターを用いて塗布し、熱風乾燥機により70℃（風速5m/秒）で1分間乾燥した後、更に100℃で10分間乾燥した。これにより乾燥膜厚が30 μ mの色材受容層を形成した。

【0036】上記のようにして、不透明支持体に色材受容層が設けられた記録用シートを得た。

【0037】【実施例2】実施例1において、前記不透明支持体として下記の支持体を使用した以外は実施例1と同様にして記録用シートを作製した。

【0038】(1) 不透明支持体の作製

平均粒径0.9 μ mの炭酸カルシウムを15重量%含有したポリエステル樹脂（PET）を二軸延伸し、密度0.9g/cm³、SRa0.17 μ mの白色ポリエステルフィルムに得た。この白色ポリエステルフィルムの両面に、酸化錫を50重量%混練したポリエステル樹脂の溶剤溶液を固形分で0.3g/m²塗布、乾燥した後、表面電気抵抗を5 \times 10⁸～5 \times 10⁹ Ω の帯電防止層を形成した。

【0039】このフィルムの両面にコロナ放電処理を行った後、溶融押出機を用いて高密度ポリエチレン（密

（接着剤組成）

塩化ビニル／塩化ビニリデン／酢酸ビニル／

56 重量部

無水マレイン酸共重合体

トリレンジイソシアネートの

37 重量部

トリメチロールプロパン付加体

エポキシ化脂肪酸アルキルエステル（分子量約350）

7 重量部

こうして蒸着層付きフィルムを得た。

【0044】LBPK80重量部とNBSP20重量部

し、おもて面（フェルト面）にはコロナ放電処理した後、10重量%の酸化チタンを含有する密度0.94g/cm³のポリエチレンを30 μ mの厚さにコーティングして、不透明支持体を得た。

【0034】

度0.960g/cm³、MI=13g/10分）を樹脂厚30 μ mで溶融押出して、一方の帯電防止層上にポリエチレンの樹脂層で被覆した（この面を裏面と呼ぶ）。次に、樹脂層を設けなかったもう一方の帯電防止層上に、溶融押出機を用いてアナターゼ型二酸化チタン15重量%及び微量の群青を含有した低密度ポリエチレン（密度0.923g/cm³、MI=7g/10分）を樹脂厚32 μ mで溶融押出して、光沢面を有する樹脂層で被覆した（この面をおもて面と呼ぶ）。

【0040】裏面の高密度ポリエチレン樹脂層面をコロナ放電処理した後、帯電防止剤として酸化アルミニウム（アルミナゾールー100、日産化学工業（株）製）及び二酸化珪素（スノーテックスー0、日産化学工業（株）製）を重量比で1/2（アルミナゾールー100／スノーテックスー0）で水に分散して、乾燥後の重量で0.2g/m²となるように塗布した。

【0041】上記のようにして、不透明支持体を得た。

【0042】【実施例3】実施例1において、前記不透明支持体として下記の支持体を使用した以外は実施例1と同様にして記録用シートを作製した。

【0043】(1) 不透明支持体の作製

平均粒径3 μ mのシリカを2重量%充填した厚さ25 μ mのポリエチレンテレフタレートフィルムを真空蒸着内に配置して真空度10⁻⁴トールの条件で真空蒸着を行なって、フィルムの表面に膜厚が600Åのアルミニウム蒸着膜を形成した。この蒸着膜の表面に、下記の組成の接着剤を酢酸エチルで希釈して乾燥後の塗布量が5g/m²となるように塗布し、100℃で2分間オープンで乾燥した。

の混合パルプをダブルディスクリファイナーによりカナンディアンフリーネス300mlに叩解し、このパルプス

ラリーに下記の材料を添加した後、抄紙して乾燥し、坪量 160 g/m^2 の原紙を得た。密度はアシンキレン

パルプ
ステアリン酸ナトリウム
アニオンポリアクリルアミド
硫酸アルミニウム
ポリアミドポリアミンエピクロルヒドリン
アルキルケテンダイマー

【0046】得られた原紙の片面をコロナ放電処理した後、溶融押出機を用いて低密度ポリエチレン（密度 0.923 g/cm^3 、 $\text{MI} = 7 \text{ g/10分}$ ）を樹脂厚 $30 \mu\text{m}$ で溶融押出しして、紙の一方の面（おもて面）をポリエチレンの樹脂層で被覆した。次に、樹脂層を設けなかったもう一方の面をコロナ放電処理した後、溶融押出機を用いて高密度ポリエチレン（密度 0.950 g/cm^3 、 $\text{MI} = 8 \text{ g/10分}$ ）を樹脂厚 $30 \mu\text{m}$ で溶融押

（接着剤組成）

ポリボンドAY-651A
（三洋化成工業（株）製）
ポリボンドAY-651C
（三洋化成工業（株）製）

この塗布面と、両面がポリエチレンでラミネートされた紙の低密度ポリエチレン面とを合わせて、圧力 20 kg/cm で加熱圧着した。を作製した。

【0048】上記のようにして不透明支持体を得た。蒸着層を有する面がおもて面である。

【0049】〔比較例1〕実施例1において、不透明支持体としてPPC用紙（電子写真用普通紙）を用いた以

（2）色材受容層形成用塗布液の組成

ポリビニルアルコール（鹸化度 $78 \sim 81\%$ ）
PVA420（クラレ（株）製）

水

【0051】上記のようにして、不透明支持体に色材受容層が設けられた記録用シートを得た。

【0052】上記で得られた記録用シートについて、以下の測定方法によってそのインクジェット適性を評価した。

（1）インク吸収速度

インクジェットプリンター（PIXELJET；キャノン（株）製）により、記録用シートへの黒のベタ印字直後（約10秒後）に紙を接触押圧し、インクの紙への転写の有無で下記のように判定した。

AA：紙にインキが転写されなかった。

CC：紙にインキが転写された。

（2）画像の鮮鋭さ

上記と同一のプリンターを用いて、記録用シートに印刷された画像を目視により、画像の鮮鋭さ（画像のシャープさ）を評価した。

ダーにより 1.0 g/cm^3 に調整した。

【0045】

100 重量部
1.0 重量部
0.5 重量部
1.5 重量部
0.5 重量部
0.5 重量部

出しして、樹脂層で被覆した（この面を裏面と呼ぶ）。こうして両面がポリエチレンでラミネートされた紙を作製した。

【0047】次に、先に作製した蒸着層付きフィルムの蒸着層を設けなかった側の表面に下記の組成のポリウレタン系二液タイプの接着剤を乾燥後の塗布量が 3 g/m^2 となるように塗布し、 100°C で2分間オープンで乾燥した。

100 重量部
15 重量部

外は実施例1と同様にして記録用シートを作製した。

【0050】〔比較例2〕不透明支持体として市販のキャストコート紙（商品名：マリエスト、北越製紙（株）製；光沢度 $80 \sim 88\%$ 、米坪 $210 \sim 250 \text{ g/m}^2$ ）を用い、この上に下記の組成の塗布液を乾燥後の塗布量が 5 g/m^2 となるように塗布、乾燥した。

7 重量部
30 重量部

AA：鮮鋭さ良好

BB：鮮鋭さ可

CC：鮮鋭さ不良

【0053】実施例及び比較例の不透明支持体及び記録用シートの光沢度を下記の用に測定した。

（3）光沢度

上記実施例及び比較例で得られた不透明支持体及び記録用シートについて、JIS P-8142（紙及び板紙の75度鏡面光沢度試験方法）に記載の方法に従って、光沢度を測定した。即ち、それぞれ試験片を6枚作成し、光沢度計（デジタル変角光沢計、スガ試験機（株）製）を用いて測定した。得られた測定値の平均値を光沢度とした。

【0054】

【表1】

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	インク 吸収速度	画像の 鮮鋭さ	光沢度 (%)	
			支持体	記録用シート
実施例 1	AA	AA	87	57
実施例 2	AA	AA	95	63
実施例 3	AA	AA	99	65
比較例 1	AA	CC	6	4
比較例 2	CC	BB	81	80

【0055】

【発明の効果】本発明の記録用シートは、高い光沢度を有する不透明支持体上に特定のシリカ微粒子と水溶性バインダーからなる色材受容層が設けられている。これにより、優れたインク受容性を確保しながら、表面の光沢度も高いことから、インクジェット記録等により色材受

容層上に形成される画像は鮮鋭なものである。特に、写真印画紙用支持体などに使用されるポリオレフィンコートを支持体を使用して、上記色材受容層を設けることにより極めて高い光沢感のある鮮鋭な画像を形成することができる。

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30

40

50